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This report describes the second phase of a continuing analysis of the recorded classroom behavior of superior teachers in transaction with pupils. The problem was to discover how teaching method and style affected pupil personality development and educational progress. Eight hypotheses were tested, using 21 teachers of 507 fourth and sixth graders of high socioeconomic background. There is a significant relationship between the placement of a child in a superior classroom and subsequent self-esteem, academic achievement, and creative thinking. Height of self-concept was related to socially integrative, learner-supportive teacher behaviors. Predictions of superior reading and mathematical achievement taught by academically oriented teachers and higher self-concepts in classrooms with counselor-type teachers were unsupported. Superior pupil originality with creative teachers was unsupported. High degree of private communication with pupils yielded high self-esteem. Little support was given to the predicted relationships with democratic teacher behavior. Sequential analyses of teacher transactions with different types of children were recommended. (DO)

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The research reported herein was supported by the
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The Problem

This report is about patterns of teacher-pupil transactions in a sample of on-going elementary school classrooms in a sub-urban California city. It presents the findings from the second phase of a continuing analysis of the recorded classroom behavior of twenty-one superior teachers in transaction with their pupils within the framework of approximately two and one half hours on a typical day in school.

In the first phase of this research (Spaulding, 1962) an instrument of classroom observation and analysis was developed, data on teachers and pupils were collected, and a series of preliminary hypotheses regarding molecular behaviors of teachers was investigated. The methods employed in gathering data on teacher-pupil transactions proved feasible and satisfactory levels of inter-observer and inter-analyst agreement were obtained. The hypotheses were examined using a partial correlational technique, but the results were inconclusive. Use of the partial correlational technique with mean scores for classroom groups drastically reduced the variance entering into the tests of the hypotheses. In addition, the number of significant partial correlations obtained in accordance with or contrary to prediction were approximately equal, and the total number was about that expected on the basis of chance alone.

In the second phase of the study, therefore, attention was given first to the significance of the "teacher condition" or "classroom condition" itself, considered globally. That is, the primary problem became whether placement of pupils in one or another of the twenty-one "superior" classrooms was significantly related to variation in pupil self-concept, creative thinking, or academic achievement. Only if the significance of the "teacher condition" or "classroom condition" could be demonstrated would it make sense to try to identify particular dimensions of the classroom situation which were significantly related to the target pupil variables.

Once significance of variation between teachers was established, the problem became one of identifying the salient characteristics of the various classrooms in the sample and relating these characteristics to specific dimensions of pupil growth and development.

The Major Objectives

The principal objective of the study was the identification of significant components in the classroom behavior of teachers as they interacted with pupils in the normal day-to-day process of education in a modern, sub-urban, elementary school system. Variations in methods of instruction and inter-personal relations within classrooms exist among teachers even when they have been selected from a large number of well qualified applicants, using a single set of professional standards. Since studies in the past (Lewin, Lippitt and White, 1939; Anderson, 1939; Anderson and Brewer, 1946; Withall, 1948; Hughes, 1959) have emphasized the importance of a "democratic" classroom climate or atmosphere and of "integrative" or "learner-supportive" teacher-pupil relationships in the classroom, the question arose whether, with the range of teaching method and style curtailed through highly selective employment practices and subsequent in-service training, the patterns identified in these earlier studies continued to be significantly related to differences in pupil personality development and educational progress.

It might have been that once the extremes of "dominative" or "autocratic" behavior had been eliminated that residual variances along these dimensions no longer remained significantly operative with respect to criteria such as pupil self-esteem, creative thinking, or academic achievement. Perhaps, among a sample of highly selected teachers in a "modern" sub-urban school system other dimensions of the classroom learning process would have become important.

Perhaps, also, in a modern upper middle-class community the process of socialization for children in general had proceeded so far and so well as to have eliminated the extremes of pupil behavior which tend to elicit excessive "diminative" or "autocratic" teacher behavior.

If to a certain extent both of these conditions maintained, that is, that children in a sub-urban, upper middle-class community were more highly socialized and teachers were less dominative or autocratic in comparison to the range of pupil and teacher behavior in the original studies, we might have found that other dimensions of teacher-pupil transactions were of greater importance. Thus, the approach in this study was one of, first, testing the degree to which the results of the earlier studies were replicated in this restricted sample; and then identifying some other dimensions of the process of education in the elementary school setting which appeared to show promise for further investigation.

Specifically, the second phase of the study was concerned with the following hypotheses:

Hypothesis 1. There are significant main effects of the condition of placement within one or another of the twenty-one classrooms in the sample with respect to pupil height of self-concept, cognitive flexibility, problem-solving, cognitive synthesis, originality, reading achievement, and mathematics achievement.

Hypothesis 2. A teacher-pupil transactional pattern representing the "integrative" teacher behavior syndrome identified by Anderson (1939) is associated with superior pupil originality, cognitive flexibility, and higher overall self-concept.

Hypothesis 3. A teacher-pupil transactional pattern representing the "learner-supportive" behavior syndrome identified by Withall (1948) is associated with superior pupil originality, cognitive flexibility, and higher overall self concept.

Hypothesis 4. A teacher-pupil transactional pattern representing the behavior of the academically oriented teacher identified by Bush (1954) is associated with superior reading and mathematics achievement.

Hypothesis 5. A teacher-pupil transactional pattern representing the counseling type of teacher behavior identified by Bush is associated with higher pupil overall self-concept.

Hypothesis 6. A teacher-pupil transactional pattern representing the behavior of teachers oriented toward fostering creativity in pupils, as identified by Bush, is associated with superior pupil originality and cognitive flexibility.

Hypothesis 7. Teacher classroom behavior characterized by a relatively high degree of private or semi-private communication with children, of overt facilitation of task oriented behavior, of concern for divergent responses in children, of attentiveness to pupil needs, of the use of control techniques involving humor - and a relatively low degree of negative evaluation, of domination through threat, of firmness in tone, of teacher-supportive control, of harsh "taskmaster" behavior, and of grim domination - is predicted to be associated with superior pupil reading achievement, mathematics achievement, originality, cognitive flexibility, and higher overall self-concept.

Hypothesis 8. A teacher-pupil transactional pattern representing "democratic" leader behavior, as identified by Lewin, Lippitt, and White (1939), is associated with superior pupil reading and mathematics achievement, cognitive flexibility, originality, and higher overall self-concept.

Related Research

Objective description of the dimensions of teacher behavior in the classroom and of the concomitants of such behavior has been recognized as a problem of major importance for many years, but the practical problems of studying so complex a process have tended to divert investigators from behavioral procedures and incline them to the use of rating scales and "tests" of "teaching ability," and various other predictors of teaching success. Domas and Tiedeman (1950) in a review of the research on teacher competence during the years 1890-1949 reported the overwhelming majority of studies as based upon judgments of administrators, supervisors, pupils, and other teachers.

One of the important investigators in teacher competence who early came to feel that more objective, behavioral studies were necessary was Barr at Wisconsin. He had conducted a series of studies (1929; 1931; 1935a) in an effort to isolate some of the variables which could be used as predictors of teaching effectiveness using gains in pupil achievement

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as criteria. In one of these studies (1935a) Barr had administered 19 rating scales, tests and inventories to a sample of 99 elementary school teachers in grades 2 through 7 in five Wisconsin cities. These included several well known personality, intelligence, aptitude, interest, and achievement tests for which validity and reliability data had been established. The criteria of teaching effectiveness used were (1) pupil gains made on the Stanford Achievement Test, (2) a composite of superintendents' ratings on several scales, twice applied, (3) a composite of scores on nine measures of qualities "commonly associated with success," and (4) a composite of all three of the foregoing. Correlations of measures of antecedent variables with the several criteria were exceedingly low," most falling within the range of 0 to .35.

Barr felt that these unsatisfactory results were due to errors in measurement on all variables, the wide range of behavior being measured, and the minuteness of the contribution made by any one variable measured in the present study compared to the whole of the teaching process. His appreciation of the complexity of the teaching situation is reflected in these words:

> I think that we do frequently overlook the fact . . . that the teacher brings into a given teaching situation not merely a knowledge of the subject matter taught or method of teaching but her whole active self. . . . It seems to me that in our attempts to measure teaching ability we have fallen into the same errors of part measurement into which the early makers of intelligence tests fell. . . . It seems to me . . . that the ultimate criterion of teaching success will have to be found in the changes produced in pupils measured in terms of the objectives of education. . . . These changes or products of instruction will have to be considered broadly. We shall have to take into consideration not merely knowledges and skills and the more tangible outcomes of instruction, but attitudes and ideals and the less tangible outcomes of instruction (Barr, 1935a, pp. 566-68).

Two of Barr's students (McCoard, 1940; Jayne, 1945) attempted to develop more objective measures of the teacher "in action." McCoard recorded - under controlled studio conditions - the voices of 40 teachers who had earlier been studied by Rostker (1945). He submitted the recordings to a panel of 22 speech teachers acting as judges. He found that a composite rating of the quality of their voices was significantly related to the effectiveness of these teachers as measured by a criterion obtained by combining average pupil gain and supervisory ratings of effectiveness. The correlations with pupil gain taken alone were slightly lower than with the supervisory ratings but in no case did they fall below the 5 percent level of significance. McCoard's work immediately signaled the importance of verbal cues to the learning process but the manner in which specific cues operated was not clarified since the cognitive frames of reference used by the judges remained covert.

Jayne recorded two classroom periods in 28 of the classrooms used by Rostker (1945). He recorded an average of 41 minutes of teaching per classroom. The sound recordings were transcribed and a detailed analysis of "primary" teaching activities - questioning, commenting, explaining, illustrating - was made. A clustering of positive correlations (.45 to .55), some reaching significance ($p < .05$ to $p < .01$), indicated the importance of "fact" questions, "thought" questions, supplying "factual information," and "suggesting the importance of a child's contribution" to educational achievement. Jayne's work was a forerunner of the current studies of cognitive interaction and gave some indication of the value of eliciting convergent and divergent thinking as well as supplying factual information.

In the now classic study by Lewin, Lippitt, and White (1939) in which the differential effects of authoritarian, democratic, and "laissez-faire" leader behavior were studied, autocratic leader behavior was found to result in inter-personal tension and a relatively high rate of productive effort. The democratic leaders' behavior was associated with cooperative production, ease of movement and personal interaction, and a minimum of hostility and aggression. The behavior of the boys in the "laissez-faire" club groups was inconsistent; the boys were sometimes apathetic and at other times hostile and aggressive, with a generally poor record of concrete achievement. When a critical outsider was introduced into the autocratic groups while the leader was absent his presence acted like a catalyst. The boys immediately resorted to acts of aggression and overt hostility.

In another classic series of studies by Anderson (1937, 1939), Anderson and Helen Brewer (1945), and Anderson and Joseph Brewer (1946), patterns of "dominative" or "socially integrative" teacher behavior were identified and measured with reliability. Anderson found that those teachers whose functional relations with the children were predominantly of an integrative nature had classrooms in which children showed more spontaneity and initiative. When domination prevailed children were observed to be less responsive to classroom situations.

Impressed by the results of Anderson's studies and the literature on personality development, Marie Hughes (1959) made an intensive analysis of the classroom behavior of 41 elementary school teachers in eight different school districts in two western states. She found that "eighty percent of all records showed that the teachers were dominative in over fifty per cent of their total teaching acts. . . . Approximately three-fourths of the teachers had forty or less per cent of their total teaching acts integrative" (p. 293). Primary teachers were found to be more controlling and more negative than middle or upper grade teachers. These results were obtained even though there "was little evidence of 'discipline' problems in the common meaning of the term. The children were orderly, well behaved, and trying to please the teachers" (p. 290). The patterns identified by Anderson twenty years earlier were present to some extent in all of the elementary grades, in varying sections of the country, and in a variety of communities.

Hughes found, also, that among those teachers "judged-good" by professional personnel of the county staff in a county where a representative sample was drawn, individuals were found with scores placing them on opposite ends of the "dominative index." The question of appropriate criteria for evaluating teacher behavior, raised by Barr many years before, is posed again by these results.

Among others investigating patterns of teacher behavior was Withall (1948). He categorized teacher classroom statements and questions and derived a "climate" index which reflected the degree to which such verbal behavior was "learner-supportive" or "teacher-supportive." He found reliable differences between "climates" in the rooms of the several teachers who taught a specific group of seventh grade children.

Using Withall's technique, Mitzel and Rabinowitz (1953) and Wandt and Ostreicher (1945) found that individual teachers differed markedly in their verbal behavior depending on the specific situation, as well as differing markedly from each other in their typical or average behavior.

In discussing possible extensions of their research, Mitzel and Rabinowitz hypothesized that "consistency of classroom climate reduces anxieties on the part of pupils, and ... such anxiety reduction facilitates social and intellectual growth" (p. 15).

The importance of evaluating the effects of such patterns of teacher behavior led Flanders (1951) to study the behavior of seven university students under experimentally produced "learner-centered" and "teacher-centered" climates. He found the students' ability to name, elaborate, use and recall the principles in question to be greater for the "learner-centered" periods than the "teacher-centered" ones. Through an analysis of variations in pulse rate, galvanic skin responses, and direction and intensity of movements of a lever operated by the students to indicate positive and negative feelings Flanders arrived at the following conclusions:

> (1) Student behavior associated with interpersonal anxiety takes priority over behavior oriented toward the achievement problem.
>
> (2) Teacher behavior characterized as directive, demanding, deprecating by the use of private criteria, and, in general, teacher supporting elicits student behaviors of hostility toward self or the teacher, withdrawal, apathy, aggressiveness and even emotional disintegration.
>
> (3) Teacher behavior characterized as acceptant, problem oriented, evaluative or critical by way of public criteria, and, in general, student supportive, elicits student behaviors of problem orientation, decreased interpersonal anxiety, integration and even emotional readjustment (p. 110).

In another study using Withall's technique and seeking outcomes of specific patterns of teacher behavior, Perkins (1951) investigated learning, self-reported feelings, and tension levels in six in-service teacher child-study groups. The six groups were classified as "group-centered" or "leader-centered." Perkins reported that:

> Differences in social-emotional climate did produce significant differences in group learning as revealed in verbal statements made by participants in group meetings. Significantly more child development concepts were expressed in group-centered climates than in the leader-centered climates when total groups, group members minus leaders, and leaders only were compared. Group-centered groups revealed greater objectivity and warmth in their attitudes toward children whereas the attitudes in leader-centered groups were proportionately more emotional, conventional and cold. Group-centered groups were markedly superior to leader-centered groups in their greater use of supportive evidence to substantiate statements and the greater incidence of insight and soundness of reasoning process (pp. 116-117).

He also found that the leader-centered groups showed more dependence on the leader and tended to express more "felt inadequacy and uncertainty." Leader-centered climates evidenced more group and speaker tension. In group-centered climates a greater amount of tension release through laughter was found. Perkins comments:

> The effect of tension on group learning was strikingly revealed. Statements indicating presence of tension contained fewer child development concepts, lacked warmth and acceptance of children, were less adequately supported, and were more subjective and self-involved. The implication is clear that in a warm-accepting, permissive, group-centered climate, tensions are less likely to arise. If they do arise, there are generally more resources in the group-centered climate to channel or reduce these deterrents to learning (p. 118).

The idea that such two-fold classifications were inadequate was suggested by Bush (1954). He presented data which indicated the existence of several "types" of teachers and that certain types are able to establish more effective relationships with certain "types" of pupils. He distinguished three types of pupils and teachers initially (on a tentative, speculative basis) and suggested that "a certain type of student tends to work successfully with one, rather than another, type of teacher" (p. 170). The three "types" of teachers were "academic" (or "subject-matter oriented"), "child-centered" (or a "counseling type"), and "creative" (oriented toward fostering creativity). The children were classified as "academic," "pupils with predominantly emotional needs," and "creative" pupils. Bush felt that "it is probably because of attempts to appraise all teachers according to the same criteria, assuming all are trying to be the same type, that such low correlations are obtained in studies of teaching competence and few universal characteristics are found for all 'good' teachers" (p. 181).

Sharing Bush's feeling that there are several kinds of teachers and several kinds of pupils and that they interact differentially, Heil, Powell, and Feifer (1960) explored the achievement and friendliness gains made by four types of elementary school children under the guidance of three types of teachers. Using a story completion method with pupils in fifty Brooklyn classrooms the authors identified the children as 1) conformers, 2) opposers, 3) waverers, or 4) strivers. The teachers were identified as A) turbulent, B) self-controlling, or C) fearful by means of an interest inventory (Manifold Interest Schedule). Results showed the "self-controlled" teacher to be generally more effective. The "turbulent" teacher appeared to work equally well with "conforming" and "striving" children, but significantly less well with "opposing" or "wavering" (anxious) children. The "fearful" teacher was significantly less effective generally.

An important additional finding of Heil's study was the lack of any correlation (r = .070) between the measure of pupil gain and the overall observer rating, based upon dimensions of classroom behavior "generally assumed to be effective in promoting learning" (p. 58). As was suggested in the study by Hughes, results of this research show that, in many instances, "the teachers receiving poorer ratings by observers are the ones obtaining higher achievement with children" (p. 66). Although the overall behavior ratings of the teachers (involving 19 dimensions of teacher behavior, psychological climate, and pupil behavior) were uncorrelated with pupil achievement gains, an examination of the profile of the "self-controlled" teacher suggests the importance of consistency, structure, routine activities, and orderliness - especially for "opposing" or "wavering" (anxious) children.

With the intent of isolating significant specific aspects of the classroom behavior of teachers, a group of researchers under the leadership of Jacob Kounin (1961) has been investigating audience reactions to specific techniques of classroom control. In one study college students who had witnessed a male classmate admonished for coming late to class were found to be affected significantly by it. Under an experimental condition - in which the instructor threatened "This cannot help but affect my evaluation of you and your grade" - students reported significantly lower judgments of the instructors' helpfulness, likeability, freedom from authoritarianism, and fairness when compared to reports by students who witnessed a supportive control measure (i.e. asking the late-comer to be on time in the future and then offering help in acquiring the lecture material he had missed). Threatening techniques also resulted in higher ratings of classroom tension.

In an experiment in regular classrooms with eighth and ninth grade children Ryan, Gump and Kounin (1961) studied the effects of three "desist-techniques." Under one condition the teacher was punitive and intense. When a pre-trained male student got up while slides were being shown and sharpened his pencil the teacher stalked toward him, saying "Hey you, who do you think you are?" in a firm, irritated voice; put her arm on his shoulders in a gesture of pushing him into his seat and said, "Now sit down! If you ever do that again, I'll really make trouble for you" (p. 237). A second condition involved a matter-of-fact reprimand - i.e. "Don't do that again. Please sit down in your seat now." Under the third condition the teacher indicated her awareness of the behavior but did nothing about it. When the effects on the audience children were compared under the three conditions the punitive technique was found to result in "the subjects' rating the deviancy as 'most serious,' the degree of interference with attention to the task as 'greatest,' the teacher as 'making too much of an issue' over the event, the experience 'most discomforting,' and the teacher 'best able to maintain order in a class of 'tough kids'" (p. 237). The simple reprimand resulted in the students reporting the highest ratings for teacher fairness and paying more attention to the lesson after witnessing the event. Under the "ignoring" condition pupils rated the teacher highest in her liking for children but thought the misbehavior most likely to recur.

Elizabeth Alden (1959) investigated audience reactions to specific "desist-techniques" used by a visiting teacher. Four conditions of teacher "expertness" and "liking" for children were established by varying the experimenter's introduction of the new teacher. All the experimental groups of fifth grade school children were given a lesson in secret writing. "A 'high expert' was introduced as knowing all about codes and as having a high position in the military intelligence for coding and decoding secret codes; the 'low expert' was introduced not as an expert but simply as a teacher who had agreed to teach the lesson. The 'high liking' new teacher was introduced as being very fond of children and the 'low liking' as not caring about children one way or another" (reported by Kounin, Gump and Ryan, 1961; p. 239). Two control techniques used resulted in eight treatment groups. In four groups a "task-focused" desist-technique was used - i.e. "I see a boy playing with some paper clips. Because secret writing demands concentration, I don't see how he can learn much about it when he plays with things instead of paying attention." In the other four groups the control technique employed was "approval-focused" - i.e. "I see a boy playing with some paper clips. I just don't like a boy who plays with things when he should be paying attention."

Alden found that when compared to ratings of the teachers made before the lesson the "task-focused" desist-technique increased audience-children's ratings of the teacher's skill in handling children and increased their rated degree of interest in secret writing. This result was present under all four teacher introduction conditions. In addition, Alden found that "when an expert teacher used a task-focused technique it increased the children's judgment of how much she liked pupils and would be inclined to reward pupils; it resulted in the pupils considering the deviances she corrected as being more serious and feeling less inclined to misbehave themselves; and it led to a greater amount of information recalled by the pupils from the lecture itself. The influence of being introduced as having high liking for children made a significant difference on one measurement: a teacher with high liking for children and high expertness using task-focused desist-techniques resulted in pupils feeling more inclined toward discussing personal matters with her" (reported by Kounin, Gump and Ryan, 1961; p. 240).

As part of an extensive research project investigating pupil self-concept and achievement motivation in naturalistic classroom settings Pauline S. Sears (1957, 1960) studied the classroom behavior of eleven teachers from the Kindergarten level through the sixth grade for five days in the fall quarter and five days in the spring. Time samplings of teacher rewarding, punishing, and teaching behavior were made by a trained group of observers. Interobserver agreement ranging from .75 to .85 on major categories was obtained after a series of training sessions in which the same teacher was scored by two or three observers independently. Unpublished results of this pilot study indicate that within the range of behavior observed in seven classrooms at the fifth and sixth grade level superior pupil achievement, creativity, and self-esteem were related positively to the proportion of time the teacher listened attentively to individual children or the group. Supporting individual children by showing personal interest appeared to be related to superior creativity in both boys and girls. Although the small number of classes studied did not permit tests of significance the positive influence of reward by emphasizing a child's remark and taking a role of equality with the children in activities and games was suggested. Punishment in which the teacher implied by a word or caution or a reminder that the child's behavior was inappropriate appeared to be negatively related to pupil self-concept, achievement, and creativity. Other findings suggested the importance to pupil self-esteem of praising a child for his ability, controlling by reasoning with him or by asking for an explanation of the situation, and instructing by eliciting a child's interpretation or solution.

These and other studies of classroom teacher behavior (Smith, 1959, 1960; Aschner, 1958) suggest the following guidelines for further research:

1) Research into classroom teacher behavior calls for specific criteria expressed in terms of measurable dimensions of pupil behavior, rather than judgments of competence by supervisors, administrators, or other specialists.

2) The complexity of transactions in the classroom calls for an analysis of the observable dimensions of the process, using reliable information gathered in the classroom as the events occur.

3) The multiplicity of purposes and needs of both teachers and pupils calls for the identification of the manner in which specific behaviors of pupils elicit specific types of teacher behavior, and how specific personality characteristics of pupils or teachers relate to the types of sequences observed.

4) At this time, a number of variables or dimensions of the process of transaction in the classroom appear to warrant further study; among them are these:

a. the manner in which teachers divide their time into molar categories communication and non-communication, both affective and cognitive

b. the manner in which approval is manifest

c. the manner in which disapproval is manifest

d. the manner in which non-affective teacher communication of information occurs

e. the manner in which teachers receive information

f. the manner in which teachers express the authority vested in their positions

g. the shifts and plateaus in emotional tone or mood which tend to set the climate of the classroom

h. the publicity of the communications of pupils and teachers

i. the types of pupil behavior which elicit approval or disapproval

j. the content or nature of the non-affective information communicated

k. the dimensions of the cognitive restructuring which occurs in the process of transaction

l. the manner in which the behavior of teachers in proceeding from one transaction to another implies covertly the approval or disapproval of some previous behavior of a child or the class

m. the direction of the communications of teachers, whether to a boy, girl, sub-group, or the class as a whole

5) Several situational variables also appear to be of importance:

a. the activity level of the children in the classroom

b. the noise level of the classroom activity

c. the time of day (or the time or part of the period)

d. the day of the week (Fridays in contrast to Mondays, for example)

e. the subject matter being studied at the time

f. the number of pupils in the class

g. the proportion of boys in the class

h. the time of the year, whether early fall (when limits are unclear) or later when the expectations for behavior have been clearly defined and understood

6) Classification of teacher-pupil classroom transactions into types or patterns should rest upon data obtained in the on-going setting rather than exclusively upon data gathered with pupils or teachers independently. This is not to say that studies of transaction of specific "types" of pupils and teachers should not be carried out, but that patterns of transaction are in part a product of the setting itself.

7) Results of previous studies indicate that there may be types of teacher-pupil transactions which are particularly related to specific persistent personality factors in both teachers and pupils.

In the present investigation attention has been given first to the affective dimensions of teacher-pupil transactions and the kinds of behavior of boys and girls which elicit specific types of overt teacher controlling and instructional behavior. The manner in which specific dimensions of cognitive functioning on the part of individual children are elicited or suppressed by specific cognitive characteristics of teacher communications has not been investigated. In the pages to follow the variables which were selected for inclusion in the study are described. These have been selected with the view of testing the hypotheses posed earlier.

Procedure

Subjects. Several communities in the San Francisco Bay area were considered as possible locations for this study. After discussions with the administrative personnel in some of the larger school districts, it was decided that the El Roble Unified School District would provide the best opportunity. The district was large enough so that a sufficiently large number of middle grade classrooms were available and a good working relationship with personnel in the district had been established through cooperative activities in the past. In particular, the current study was initiated as an outgrowth of an extended investigation of self-esteem and achievement motivation under the direction of Pauline S. Sears of Stanford University, a research project centered in the El Roble elementary schools.

Many factors contribute to the quality of the schools in El Roble. The community is adjacent to a large university and is close enough to San Francisco to serve as a residential area for business, professional, and skilled personnel employed in the city. El Roble has its own light industrial facilities, research institutions, and specialized agencies of government and private enterprise which attract highly educated persons with a wide range of specialized skills and interests. The number of qualified persons applying each year for teaching positions in the El Roble schools always exceeds the number of openings and highly selective employment practices are possible. The district carries on its own educational research program and the curriculum and methods of instruction are regarded by professional persons as representative of the better, "modern" practices.

The study was designed to maximize the possible influence of particular patterns of teacher classroom behavior upon a given group of elementary school pupils. To this end the period of data collection was planned to cover one school year and only classrooms in which teachers were responsible for the major areas of the curriculum with a single group of children were selected. Situations in which team teaching or departmentalization were being practiced were not included.

The sample was further narrowed to take advantage of the existing measurement and evaluation program of the El Roble school system which called for mental ability testing in the fourth and sixth grades in October 1960. Use of fourth and sixth grade classrooms provided differential analysis by grade level and age of pupil, and sampled the range of practices in the middle grades.

Working through the central office of the district, all the teachers in ten school buildings (who were teaching at the fourth or sixth grade levels) were invited to come to meetings to hear about the research. These schools were selected to reflect the general geographical distribution of the twenty-one school buildings in the district and the range of socio-economic status of the general population. After an explanation of the general purposes of the study, the teachers interested, among those with self-contained classrooms, were invited to participate. From the pool of approximately forty who came to the meetings about thirty-five were both interested and willing to participate, but only twenty-one were found to have self-contained classrooms. These twenty-one were distributed through nine elementary (K-6) schools in the district. Table 1 presents the distribution of the sample by grade level and sex.

Table 1

Teacher Sample Distribution by Grade Level and Sex

Group	Fourth Grade	Sixth Grade	Total
Men	4	9	13
Women	6	2	8
Total	10	11	21

Those teachers who had indicated an interest but could not be included because of team teaching or departmentalization were used, in part, in practice runs using the instrument of observation and analysis and in obtaining reliability estimates for the newly developed procedures.

The pupil sample selected by this process included 266 boys and 241 girls for whom complete data were finally obtained. These children represented 96.4 per cent of the total number of pupils registered in the research classrooms for the period August 1960 - June 1961.

As a group, these children are quite unrepresentative of the United States as a whole. The mean socio-economic status of the total group (using the seven-point Hollingshead Index of Social Position) was 2.2 with a standard deviation of .66. This places the sample of children primarily in the top three categories of the Index - i.e. children whose fathers are higher executives, proprietors of large concerns, major professionals, proprietors of medium sized businesses, or minor professionals. Relatively few children in the sample came from families where fathers were employed as clerical workers, sales workers, technicians, farmers, skilled manual workers, machine operators or semi-skilled workers, unskilled laborers, or share croppers.

A comparison of the achievement and mental ability ("school-learned ability") of the children in the sample with the national norms published for the Sequential Tests of Educational Progress (STEP) and the School and College Ability Tests (SCAT) by the Educational Testing Service[1] also illustrates the limited range represented. Table 2 presents the group means and percentile rankings in achievement and mental ability for the fourth and sixth grade groups.

Table 2

Group Means and Percentile Values

for Pupil Achievement and Mental Ability by Grade Level

Group	Achievement (STEP)[a]				Mental Ability (SCAT)[b]	
	Reading		Mathematics		Total	
	Mean	%ile	Mean	%ile	Mean	%tile
Fourth Grade	270	85	254	82	253	88
Sixth Grade	282	79	266	84	269	83

[a] Achievement was measured in May and June and, therefore, fifth and seventh grade fall norms have been used.

[b] Mental ability was measured in October and fourth and sixth grade fall norms have been used.

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[1] The Sequential Tests of Educational Progress, Technical Report, Catalog No. 031-00-9, and The School and College Ability Tests, Technical Report, Catalog No. 150-00-9. Cooperative Test Division, Educational Testing Service, Princeton, New Jersey, 1957.

Research design. The overall design of the study called for the following schedule of observation and measurement:

Antecedent or concomitant *variables*	*Intervening variables*	*Consequent variables*
Fall	Winter	Spring
a) Pupil variables	c) Classroom variables	d) Pupil variables
-mental ability	-teacher-pupil transaction variables	-achievement
-socio-economic status	-activity level	-self-concept
-chronological age		-creative thinking
b) Situational variables		
-class size		
-proportion of boys		
-sex of teacher		
-experimental class (SMSG)		
-grade level		

Instruments and data collection procedures. Pupil mental ability was measured using the *Cooperative School and College Ability Tests* (SCAT) of the Educational Testing Service. Spring academic achievement (reading and mathematics) was measured with the Educational Testing Service *Cooperative Sequential Tests of Educational Progress* (STEP). Statistical characteristics of these tests may be found in Appendix B.

Occupation of the fathers of the pupils in the sample and the *Hollingshead Index of Social Position* formed the basis for estimations of socio-economic status.

Pupil self-concept regarding general personal competence in school activities and classroom tasks was measured using an inventory modified from one devised by Pauline S. Sears of the Laboratory of Human Development, Stanford University. The Sears self-concept measure was extended to include areas of creativity as well as mental abilities of a more conventional nature. A copy of the Self-concept Inventory has been included in Appendix B. Reliability estimates for the instrument were obtained by the test-retest method in one of the sixth grade classrooms in the sample with a four week interval between administrations. Reliability coefficients of .85 and .82, for height of self-concept and differentiation of self-concept respectively, were obtained.

The Kaya Puzzles Test, a creative thinking test developed by Esin Kaya at New York University for use with elementary school children, was used to obtain measures of flexibility, problem solving, synthesis, and originality. A reliability estimate of .71 was obtained for the total battery using a split-half method and the Spearman-Brown correction (Appendix B).

Pupil chronological age, grade placement, class size, proportion of boys in each class, sex of teacher, and existence of an experimental mathematics curriculum (SMSG) were determined by examination of school records or direct observation.

In order to obtain data on variables of teacher-pupil transaction and the activity levels of the children in the various classrooms an instrument of observation and analysis was developed. A manual which described the instrument, the Transaction Sample: Classroom (TSC), and its use has been included in Appendix B. The following variables, many of which were identified earlier (pp. 17-18), are measured by the instrument:

1. manifest teacher approval (approval)
2. manifest teacher disapproval (disapproval)
3. non-affective teacher communication of information (instruction)
4. non-affective teacher receiving of information (listening)
5. manifest teacher expression of authority (source of authority)
6. emotional tone or mood of teacher (tone or mood)
7. publicity of teacher and pupil communications (publicity)
8. type of pupil behavior approved or disapproved (regarding approval or disapproval
9. content or nature of non-affective communicated information (regarding instruction or listening)
10. covert sequential teacher reinforcement of pupil behavior (sequential reinforcement)
11. direction of teacher communication - either boy, girl, group, or class as a whole (direction)
12. teacher scanning or observational behavior (observation)
13. teacher solitary behavior or personal activity (personal activity)
14. teacher transaction with adults (communication with adults)
15. teacher absence from the classroom, on an errand, etc. (absent from room)
16. activity level of children in the classroom (activity level)
17. subject matter area of the curriculum at the time of transaction
18. time of day

The phrases in parentheses indicate the names of the variables as they are referred to in the TSC Manual and in subsequent pages of this report.

Rather than identify teacher and pupil "types" before hand and investigate the relationships between the behavior of these types in the classroom, the approach taken in this research has been to identify, at the moment of transaction, the specific types of behavior on the part of the pupils which elicited specific types of behavior of teachers. It is recognized, however, that ultimately it will be necessary to identify the manner in which individual pupils with specific personality characteristics respond in the classrooms to specific patterns of teacher behavior.

The TSC, as developed for this research, combines observation of events in the classroom as they occur with the use of a magnetic tape recorder to record verbal behavior. The method employs a 15 second observational time-sampling technique which is synchronized with a signal superimposed on the tape recording. The analysis and encoding of the classroom transactions are made later when there is adequate time to listen to the verbal transactions over and over again and to relate them to the objective information recorded by the observer.

Early in January 1961, before the regular data gathering observations in the sample classrooms were to begin, several practice observations were made in trial classrooms. Simultaneous observations were made, with two observers using synchronized watches, for several class sessions on subsequent days.[2] Between observations the recorded data were compared to locate areas of unreliability in the process of measurement. After several practice runs in a third grade classroom, a satisfactory level of agreement had been obtained and a sixth grade was selected to try out the instrument of observation and the recording technique on an extended basis. Simultaneous observations and tape recordings were made for four full mornings on consecutive days. After the first day in the sixth grade an analysis of areas of disagreement was made and the instrument of observation was refined and extended as necessary. No further adjustments or refinements of the instrument were made during the last three days of observation. Estimates of observer reliability which were obtained using data from the final three mornings ranged from a low of .86 on "direction of teacher transaction" to a high of .97 on "publicity of transaction" (Table 3).

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[2] The principal investigator and Margaret Pintler, a research assistant on the staff of the Laboratory of Human Development, made the observations.

Observations and data recording were begun on January 17th and continued, virtually without interruption, through Friday, March 24, 1961. Each teacher was observed for three full mornings and had been told in advance when the observer would arrive. The two observers who had been trained in the trial classrooms gathered all the data, alternating classrooms each day so that (with two exceptions) teachers were observed by both persons. This was done to try to randomize over days of observation any observer bias that had not been eliminated in the training period.

It might be added, at this point, that in the present report only data from the third morning of observation have been used. The original plan called for an analysis of data gathered on all three days but time demands have required the restriction of the present phase of analysis to data from the third morning. This decision was made after examination of the data from the third morning indicated that it had relatively high internal consistency (Table 3). It was, also, the subjective experience of the two observers that the teachers became relatively more relaxed and involved in their duties after the first day and seemed to forget the presence of the observer entirely for long periods of time. Testimony of the teachers after the observation sequence was completed tended to support this contention. However, no check on observer effects was possible in the present analysis.

The tapes which were made in the trial sixth grade classroom were analyzed by the principal investigator and a research assistant, independently. After discussion of areas of disagreement, sections of the Transaction Sample: Classroom (TSC) relating to tape analysis were revised and extended to clarify the categories and allow for contingencies which had not been foreseen. With the TSC manual in its final form, independent analyses of twenty-five minutes of transaction in each of four research classrooms (or about 400 units of behavior in all) were made by the principal investigator and the research assistant. Coefficients of agreement between tape analysts ranged from a low of .47 (for the type of behavior approved or disapproved) to a high of .92 (for the type of molar behavior engaged in by the teacher - that is, whether approving, disapproving, instructing, listening, observing, etc.[3]). Table 3 presents reliability and validity estimates for the dimensions of classroom transaction measured and analyzed in this study.

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[3] TSC Manual, Appendix B (p. 8).

Table 3

Reliability and Validity Estimates for Dimensions of Transaction (TSC)

Dimension	Inter-observer or Inter-scorer agreement T = tape coding O = observation		Stability of tape analysis over four mo. interval	Average stability of all data within the third morn.	Average stability of all data used in this report
Molar behavior[a]	T	.92	.93	--[b]	--[b]
Approval techniques	T	.51	.90	.62	.73
Disapproval techniques	T	.64	.54	.55	.75
Instruction techniques	T	.65	.84	.85	.85
Listening techniques	O	.92	--[c]	.54	.54
Source of authority	T	.91	.88	.70	.76
Mood or tone	T	.74	.95	.62	.77
Publicity of transaction	O	.97	--[c]	.88	.88
Regarding type of behavior controlled	T	.47	.71	.61	.74
Regarding content of instruction or listening	T	.73	.81	.67	.84
Sequential reinforcement	T	.70	.76	.84	.84
Direction of transaction	O	.86	--[c]	.76	.81
Activity level of pupils	O	.96	--[c]	--[b]	--[b]

[a] Molar behavior includes approval, disapproval, instruction, listening, observation, communication with adults, personal activity, and absence from the classroom.

[b] Not computed.

[c] Based on observer's records only.

Included in Table 3 are stability coefficients for the process of tape analysis. Since the principal investigator analyzed all the tapes (recorded on the third morning of observation) after having first obtained satisfactory levels of inter-scorer agreement, as mentioned above, it was felt that some measure of the consistency and stability of the analyst over the period of tape analysis was needed. Consequently the tapes from the four classrooms initially used to get inter-scorer agreement were set aside until all the other data had been collected and the tapes from the other seventeen classrooms had been scored. Thus, it was four months later when the tapes from the four classrooms were finally rescored. The second column in Table 3 presents the coefficients of agreement between the two sets of data scored by the same person with a four month period intervening.

The final two columns of Table 3 are based upon a correlation of scores from split-halves of the data obtained during the third morning of observation in each of the classrooms. Halves were obtained by taking every other consecutive decade of sampling, representing alternating periods of two and one-half minutes each. The Spearman-Brown correction was used to estimate internal consistency (stability over episodes). Of the 123 values designated (as points along or types within the eleven dimensions included in this analysis) ninety-nine reached or exceeded a level of .50. Those categories of the dimensions which showed a stability of less than .50 were excluded from further analysis in the current phase of the study. It was assumed that, although the data appeared to have been reliably measured, the teacher's behavior was so erratic (i.e., the values obtained so unstable) that an extended period of observation would have been necessary to obtain useful data. The final column (at the right hand side of Table 3) presents the average level of stability of the data used in this report.

Spring testing of the pupils in the sample classrooms began on May 5 and continued through June 8, 1961. The total number of pupils enrolled throughout the entire school year was 526. There were 19 pupils who had to be dropped because of absences during the original testing days and the make-up periods. As was mentioned earlier, the 507 children remaining in the sample, for whom data was obtained on all variables, comprised 96.4 per cent of those registered from October through June.

The spring measures of pupil variables were made by the principal investigator in the regular classrooms when single classrooms in a particular building were involved, or in the multi-purpose rooms when several research classrooms were located in one building. Care was taken to insure privacy and quiet during the administration period and an opportunity for rest between sessions. Two mornings on consecutive days were used to complete the testing for each group.

The directions given to the pupils for completing the Kaya Puzzles Test and the Self-concept Inventory are given in Appendix B. The SCAT reading and mathematics sub-tests were given as directed in the published manual.[4] Reliability and other statistical characteristics of the several instruments used are summarized in Appendix B.

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[4] Directions for administering and scoring the Sequential Tests of Educational Progress, Catalog No. 030-00-0, Cooperative Test Division, Educational Testing Service, Princeton, N. J., 1957.

Analysis of the data and findings

A modified covariance procedure was used to test the significance of the "classroom condition." Pupils were assigned scores (zero if not assigned to a particular classroom in the sample, one if present in a particular classroom) and these scores were employed in a multiple regression least squares solution. Two regression equations for each target variable were obtained - one which included the classroom "scores" as predictors along with mental ability, socioeconomic status, chronological age, and sex of pupil; and one which employed only the last four variables. The significance of the difference between the two residual variances in each case was tested using the $\underline{F}$ ratio.

Table 4 presents the results of the analysis of covariance for eight target variables. Residual sums of squares were obtained from the two regression equations in each case and used to compute $\underline{F}$ according to the following formula:

$$F = \frac{(\text{1st residual} - \text{2nd residual})/\ m-1}{\text{2nd residual}/\ (N-n-1)}$$

where: 1st residual = residual sum of squares with four predictors

2nd residual = residual sum of squares with twenty-four predictors

m = number of classrooms (21)

N = number of subjects (507)

n = number of predictors in the 2nd regression equation (24)

Table 4

Analysis of covariance[1] - classroom condition

Target variable	Source[2]	Sum of squares	Adjusted df	*F*	*p*
1. Height of self concept (SC Mn.)	a.	21.21	20	2.53	$<.01$
	b.	202.07	482		
2. Differentiation of self concept (SC S.D. - 99 items)	a.	2.14	20	1.87	$<.05$
	b.	27.64	482		
3. Reading achievement (STEP)	a.	64.48	20	2.78	$<.01$
	b.	558.84	482		
4. Mathematics achievement (STEP)	a.	21.94	20	1.89	$<.05$
	b.	280.03	482		
5. Creative thinking - flexibility (Kaya *Puzzles Test*)	a.	12.34	20	2.48	$<.01$
	b.	119.94	482		
6. Creative thinking - problem-solving (Kaya *Puzzles Test*)	a.	88.33	20	3.54	$<.001$
	b.	601.03	482		
7. Creative thinking - synthesis (Kaya *Puzzles Test*)	a.	22.51	20	3.69	$<.001$
	b.	147.08	482		
8. Creative thinking - originality (Kaya *Puzzles Test*)	a.	57.01	20	3.74	$<.001$
	b.	367.28	482		

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[1] Adjusted for pupil mental ability (SCAT), socio-economic status (Hollingshead Index of Social Position), chronological age, and sex.

[2] Source of variance: a. = remainder (residual 1 minus residual 2)
b. = residual 2 (with 24 predictors)

The results of this analysis support the first hypothesis - that there are significant effects of placement within one or another of the twenty-one research classrooms. The differences between classrooms (including classroom teacher behavior) are significant in terms of pupil self concept and creative thinking as well as academic achievement.

With support for the significance of the classroom condition attention can be turned to the characteristics of the several classrooms which might be responsible for the differences observed in the target pupil variables.

In addition to the dimensions of teacher behavior predicted to be of importance (research hypotheses 2 through 8) a number of other factors such as the size of the class, the proportion of boys in the class, the general activity level of the children, the sex of the teacher, the grade level, and the presence (or absence) of such curricular innovations as the experimental SMSG (School Mathematics Study Group) instructional program, were investigated. These situational classroom characteristics are presented in Table 5.

Through the covariance method and the device of assigning scores (zero or one) to each student to indicate absence or presence, respectively, in a given classroom, a useful index of the relationship of the "classroom condition" to the target pupil variables was obtained. The several sets of regression weights (B weights) entering into the multiple regression equations (one equation for each of the

Table 5

General characteristics of the research classrooms

Classroom No. and Code No.	SMSG Math.	Grade Level	Class Size	Prop. of Boys	Activity Level	Sex of Teacher
1. T-03	no	4	31	61	1.45	M
2. T-04	no	6	25	64	1.98	M
3. T-05	no	6	30	47	1.60	M
4. T-06	no	6	22	68	2.20	M
5. T-07	yes	4	26	50	1.18	M
6. T-08	no	6	28	54	.95	M
7. T-09	no	6	32	56	2.28	M
8. T-10	yes	6	24	47	.30	M
9. T-11	no	6	31	48	1.48	M
10. T-12	no	6	26	54	.89	M
11. T-13	yes	4	31	39	1.23	M
12. T-14	no	6	25	68	1.30	M
13. T-15	no	4	28	57	1.57	M
14. T-52	no	4	28	57	.63	F
15. T-53	no	6	25	60	.70	F
16. T-54	no	4	26	46	2.07	F
17. T-55	no	4	32	44	2.19	F
18. T-56	yes	4	26	54	.62	F
19. T-57	no	4	26	54	1.69	F
20. T-58	yes	4	32	50	1.35	F
21. T-59	no	6	27	41	1.02	F

eight target pupil variables) form a set of such indices. These weights reflect correlation with the target variables after adjustments have been made for pupil mental ability (SCAT), socio-economic status, chronological age, and sex. Table 6 presents the weights for the eight target variables - height of self concept (SC Mn), differentiation of self concept (SC SD), reading achievement (STEP), mathematics achievement (STEP), and the creative thinking factors - flexibility, problem-solving, synthesis (organization), and originality (Kaya Puzzles Test).

Relationships of general characteristics to the target pupil variables. Using the B weights as "scores" assigned to each of the research classrooms an intercorrelation matrix was computed. The relationships obtained for the general classroom factors are given in Table 7.

These results indicate that children in the SMSG classrooms had significantly higher self concepts and were superior in reading performance in the spring measures. Their mathematics scores were higher but not significantly so even with a one-tailed test ($p < .07$).

Fourth grade children had significantly higher self concepts and differentiated less among areas of school competence. That is, there was a halo effect with respect to self concept among the fourth grade children. They felt more competent and this sense of positive self-esteem generalized to all areas of the curriculum. Fourth grade children (in contrast to sixth) also made significantly

Table 6

Multiple regression coefficients (B weights)
for eight target variables

Variable	SC Mn	SC SD	Read.	Math.	Flex.	Prob. Solv.	Synth.	Orig.
1. A (Mn.)	.749	2.491	-6.571	.078	-7.340	-.158	-3.167	-9.465
2. SCAT	.130	-.043	1.371	1.080	.389	.370	.308	.476
3. SES	.012	.000	-.081	.005	-.018	-.142	.005	-.049
4. CA	-.077	-.031	-.115	-.194	-.002	-.097	-.168	-.034
5. Sex[a]	-.078	.016	-.162	.107	-.063	-.074	-.078	-.071
6. T-03	.057	.048	-.295	-.046	.089	.110	-.113	-.239
7. T-04	.035	-.038	-.242	-.181	-.389	-.826	-.327	-.733
8. T-05	-.389	.143	-.450	-.102	-.149	.246	.078	-.154
9. T-06	-.522	-.002	-.749	-.219	.076	-.396	-.154	-.284
10. T-07	.153	-.072	.150	-.421	-.212	-.484	-.624	-.365
11. T-08	-.398	.031	.131	.039	.138	.260	.447	.130
12. T-09	-.205	.109	-.455	-.087	-.190	-.116	-.075	.287
13. T-10	.286	.106	.025	.237	-.130	-.142	.278	.371
14. T-11	.021	.082	.136	-.016	.021	.462	.265	-.436
15. T-12	-.289	.075	-.334	.127	-.015	.033	.233	-.103
16. T-13	.038	-.058	.921	.361	.165	.954	.049	-.035
17. T-14	-.131	.100	-.357	-.099	-.071	-.303	.078	-.010
18. T-15	.314	-.153	-.012	.021	-.063	-.057	-.497	-.561
19. T-52	.150	.045	.829	.404	.294	.902	-.005	.073
20. T-53	-.477	.094	-.269	.075	-.061	.055	.138	.177
21. T-54	.447	-.044	-.269	-.170	.119	-.124	.181	.524
22. T-55	.136	-.120	.388	.077	.350	-.196	.109	.575
23. T-56	.224	-.074	-.049	.118	-.238	-.594	-.006	-.058
24. T-57	.272	-.169	.487	-.304	.173	.123	.004	.585
25. T-58	.534	-.097	.693	.382	.251	.455	.084	.417
26. T-59	-.257	-.007	-.281	-.197	-.159	-.361	-.143	-.162

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[a] Sex of pupil - employ weight with sign as given if male, with reversed sign if female.

Table 7

Relationships of general classroom characteristics
to target pupil variables

	Target pupil variables							
Characteristic	SC Mn	SC SD	Read	Math	Flex	Prob Solv	Synth	Orig
1. SMSG (1 = yes, 0 = no)	.46[a]	-.23	.44[a]	.35	-.10	.05	-.10	.10
2. Grade level (4 or 6)	-.74[c]	.73[c]	-.62[b]	-.19	-.47[a]	-.24	.31	-.24
3. Sex of teacher (0 = F, 1 = M)	-.34	.40	-.34	-.17	-.38	-.06	-.14	-.58[b]
4. Class size	.21	-.03	.42	.35	.38	.53[a]	.13	.16
5. Proportion of boys	-.29	.18	-.46[a]	-.22	-.21	-.34	-.23	-.32
6. Activity level	.00	-.26	-.27	-.48[a]	.09	-.23	-.26	.00

NOTE: N equals 21

[a] Significant at the .05 level of confidence (two-tailed test)

[b] Significant at the .01 level of confidence (two-tailed test)

[c] Significant at the .001 level of confidence (two-tailed test)

greater gains[5] in reading achievement and were more flexible in creative thinking.

Children were found to be significantly more original in classrooms taught by women and were more competent in problem solving in the larger classrooms. The children in classrooms in which boys predominated made significantly fewer gains in reading achievement (with sex differences in reading achievement already adjusted for in the covariance procedure). Children also made significantly fewer gains in mathematics in the highly active classrooms - that is, in classrooms where children were out of their seats a greater proportion of the time,

Relationships among the general classroom characteristics. A number of questions arise with respect to the relationships observed between the target variables and the general classroom factors. For example, since four out of five of the SMSG classrooms were fourth grade rooms the higher self concepts and superior reading performance found in the SMSG classrooms might be explained in terms of characteristics of the fourth grade classrooms in general rather than the use of the SMSG curricular materials. Intercorrelations among the general classroom variables are presented in Table 8.

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[5] The concept of "gain" is used with respect to reading and mathematics performance since an initial measure of "school-learned ability" (SCAT) was employed in the regression equations.

Table 8

Correlations among general classroom characteristics

Characteristic	Grade Level	Sex of T	Class Size	Prop Boys	Activ
1. SMSG (0 = no, 1 = yes)	-.36	-.02	.03	-.37	-.43[a]
2. Grade level (4 or 6)		.43[a]	-.31	.25	-.06
3. Sex of teacher (0 = F, 1 = M)			-.02	.25	.12
4. Class size				-.45[a]	.24
5. Proportion of boys					.13

[a] Significant at the .05 level of confidence (two-tailed test)

When the correlation of -.36 between SMSG and grade level was "partialed out" of the relationship between SMSG and height of self concept (SC Mn) a partial correlate of .32 was obtained. This r (.32) is non-significant (two-tailed test with 20 degrees of freedom). Thus, the higher self concepts among the children in the SMSG classrooms could be accounted for by the general transactional patterns of the fourth grade teachers rather than by the presence of SMSG curricular materials and programming.

Similarly in the case of reading gains in the SMSG classrooms, the partial correlate was found to be .15 when the relationship between grade level and SMSG was removed.

Inspection of Table 8 shows the activity level of the children to be significantly correlated with SMSG but relatively independent of the other general characteristics of the classroom. Since the less active classrooms made greater gains in mathematics (-.48) the relationship of SMSG to mathematics gains with activity held constant was of interest. The first order partial in this case was .15, suggesting that activity level rather than SMSG programming was more closely related to the gains made in mathematics. A low level of physical movement and whatever transactions accompanied it in this sample appeared to facilitate achievement in mathematics. There were probably teacher behaviors closely related to activity level in the classrooms which alone could account for the mathematics gains observed. This question will be examined later when the data on teacher-pupil transactional patterns have been presented.

In summary, though class size and the proportion of boys in the classroom may independently have influenced problem-solving and reading gains, respectively, the more important factors appear to have been the behavior characteristics of the fourth grade female teachers. The procedure by which components of classroom transactions were obtained will be given next, and subsequently relationships of such components with the general characteristics of the classrooms will be examined.

Teacher-pupil transactional patterns in the research classrooms. Data obtained through the instrument of observation and analysis (TSC, Appendix B) were coded to provide percentage scores on 144 categories of classroom transaction. Not only were percentages obtained on molar categories such as teacher approval (TSC category 25-1) and teacher disapproval (TSC category 25-2) but the total units of approval and disapproval were encoded further to indicate direction, publicity, tone, technique, the aspect of pupil behavior approved or disapproved, and the source of authority used. Thus, the percentage scores obtained for the sub-categories were independent of the scores obtained for the total amount of approval or disapproval. Artifactual relationships occurred within each set of categories (molar or molecular) and these statistical restrictions varied from set to set depending upon the number of categories in the set. The notational system used to designate the several categories and sub-categories delineated in the TSC was used to identify the presence of artifactual relationships. For example, the molar categories of approval, disapproval, instruction, listening, communication with adults, personal activity, absent from classroom, and observing (with the addition of an unclassifiable category) represented an exhaustive set. For any one teacher the percentage scores obtained for the set of molar categories added to one hundred. The notations for this set were 25-1, 25-2, 25-3, 25-4, 25-5, 25-6, 25-7, and 25-8 (with 25-0 representing unclassifiable units). Thus, for the molar categories there were seven degrees of freedom (the negligible number of units unclassifiable contributed no degrees of freedom). In like fashion, 26 designated the category "source of authority employed by the teacher in giving approval." Five sub-categories within category 26 were labeled 26-1, 26-2, 26-3, 26-4, and 26-5 (with four degrees of freedom). The notation 26-0 designated unclassifiable units of "source of authority in approval."

Mean percentage scores and standard deviations for units of transaction in each of the 144 categories - as well as means and standard deviations for units involving boys or girls individually - were computed. These figures along with coefficients of internal consistency over episodes within the third morning of observation (for most categories) and a brief description of each category are presented in Table 9.

Table 9

Means and standard deviations for TSC behavior categories

TSC Cat.[b]	Behavior Description	Rel.[a]	TSC to Class, Sub-group, Boys, or Girls		TSC to Boys only		TSC to Girls only	
			Mean[b]	S.D.	Mean	S.D.	Mean	S.D.
Molar Teacher Behavior Categories								
25-0	Unclassifiable		.09	.25				
25-1	Overtly approving		11.93	2.97				
25-2	Overtly disapproving		9.95	3.59				
25-3	Instructing, demonstrating, lecturing		34.52	8.57				
25-4	Listening (in communication)		21.59	5.73				
25-5	Communication with adults		.60	.69				
25-6	Personal activity		10.55	6.28				
25-7	Absent from classroom		1.57	10.78				
25-8	Observing, watching surveying		9.22	5.88				

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[a] Coefficient of internal consistency over episodes within the third morning of observation for categories of teacher behavior without regard to direction. Coefficients for behavior scores by sex of pupil would be somewhat lower due to the smaller frequencies involved.

[b] Scores are expressed as percentages within molar categories. Molar categories are indicated by the first two digits of the three digit TSC numbers (e.g. 25-1 refers to the molar category "molar teacher behavior" and the first sub-category within this larger dimension--"overtly approving").

[c] Designates negligible frequencies in a few classrooms; means and standard deviations were not computed.

Note: Blank spaces in the table indicate that figures have not been computed.

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Table 9 (continued)

TSC Cat.	Behavior Description	Rel.	All Units Mean	All Units S.D.	To Boys Mean	To Boys S.D.	To Girls Mean	To Girls S.D.
Approval								
26-1	Source - teacher-centered, "I"	.60	6.61	4.04	5.56	4.58	6.62	5.98
26-2	Source - teacher-class, "We"	.51	.83	1.43	.91	1.82	.84	1.95
26-3	Source - class		--[c]		.00	.00	.00	.00
26-4	Source - convention	.71	92.37	4.69	93.37	5.26	92.54	6.44
26-5	Source - outside authority		--[c]		.16	.75	.00	.00
27-0	Direction - unclassifiable		--[c]					
27-1	Direction - class as a whole	.33	5.04	3.58				
27-2	Direction - sub-group	.73	6.72	5.86				
27-3	Direction - boy	.65	53.23	12.01				
27-4	Direction - girl	.43	33.86	8.89				
30-1	Publicity - all or most hear or take notice	.90	50.65	19.81	45.65	21.82	49.83	24.86
30-2	Publicity - a few hear or take notice	.89	40.03	17.78	43.75	20.36	37.31	21.58
30-3	Publicity - no one else hears or takes notice	.76	9.32	6.24	10.61	8.88	12.86	10.93
31-1	Tone - normal tone of voice, unmoved	.85	69.04	10.97	69.09	11.41	68.49	13.79
31-2	Tone - accepting, pleasant, warm	.78	25.72	9.89	25.57	9.86	27.49	13.38
31-3	Tone - humorous, joking	.65	3.60	4.23	3.79	4.42	2.35	3.88
31-4	Tone - firm, serious, concerned	.70	1.40	2.29	1.39	3.12	1.30	2.42
31-5	Tone - angry		.00		.00	.00	.00	.00
31-6	Tone - hurt	.10	.22		.16	.75	.37	1.17
32-1	Technique - emphasizes, repeats	.77	34.74	11.13	38.56	12.04	33.00	14.02
32-2	Technique - evaluates positively, praises	.68	12.08	6.63	10.46	7.23	13.04	8.65
32-3	Technique - elicits group attention	.73	6.10	6.47	4.35	6.33	7.75	7.08

(continued on next page)

Table 9 (Continued)

TSC Cat.	Behavior Description	Rel.	All Units Mean	All Units S.D.	To Boys Mean	To Boys S.D.	To Girls Mean	To Girls S.D.
Approval (continued)								
32-4	Technique - redefinition plus	.69	10.80	5.94	10.14	7.06	14.43	9.61
32-5	Technique - gives verbal or non-verbal support, encouragement	.88	19.30	10.71	21.56	13.12	14.79	13.13
32-6	Technique - takes role of equality	.75	5.41	5.28	3.90	4.63	4.55	5.81
32-7	Technique - expresses sympathy	.07	2.57	1.79	2.69	2.25	2.16	3.84
32-8	Technique - offers or gives special privilege	.61	6.77	5.24	6.01	5.43	7.41	8.42
32-9	Technique - shows personal interest	.37	--c		2.33	4.42	2.87	5.65
33-0	Regarding - unclassifiable		--c		.22	.71	.00	.00
33-1	Regarding - pro-social behavior	.17	--c		.55	1.20	.99	2.78
33-2	Regarding - personal qualities, character	.82	10.25	7.77	9.18	7.41	9.06	8.56
33-3	Regarding - personal interpretations, ideas, judgments	.87	25.97	14.48	26.69	13.83	27.58	19.19
33-4	Regarding - planning, organization	.81	1.51	2.41	1.24	2.06	1.27	3.48
33-5	Regarding - correct or accurate knowledge, skill	.94	37.79	19.08	37.95	18.45	38.38	20.20
33-6	Regarding - attention to task assigned, effort	.81	20.68	11.92	21.77	12.84	19.18	14.24
33-7	Regarding - personal grooming		--c		.09	.40	.00	.00
33-8	Regarding - personal interests	.50	2.56	3.42	2.31	5.32	3.55	5.71
Disapproval								
34-1	Source - teacher-centered, "I"	.71	17.43	8.79	16.26	12.33	14.36	14.00
34-2	Source - teacher-class, "We"	.66	5.87	5.33	5.03	8.07	9.26	21.90
34-3	Source - class	.10	--c		.92	3.65	.00	.00

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Table 9 (continued)

TSC Cat.	Behavior Description	Rel.	All Units Mean	All Units S.D.	To Boys Mean	To Boys S.D.	To Girls Mean	To Girls S.D.
Disapproval (continued)								
34-4	Source - convention	.82	76.50	11.55	77.79	14.69	76.38	22.09
34-5	Source - outside authority		.00		.00	.00	.00	.00
35-0	Direction - unclassifiable		--c					
35-1	Direction - class as a whole	.61	18.44	11.74				
35-2	Direction - sub-group	.87	11.41	9.76				
35-3	Direction - boy	.88	44.91	18.12				
35-4	Direction - girl	.79	24.83	14.92				
38-1	Publicity - all or most hear or take notice	.87	58.83	20.88	51.33	27.77	51.63	27.94
38-2	Publicity - a few hear or take notice	.81	36.21	18.34	38.93	24.04	43.38	25.37
38-3	Publicity - no one else hears or takes notice	.71	4.96	4.83	9.74	12.08	4.99	6.85
39-1	Tone - normal tone of voice, unmoved	.81	62.45	16.16	62.69	21.19	71.95	18.12
39-2	Tone - accepting, pleasant, warm	.53	4.83	4.48	7.33	8.52	5.36	7.48
39-3	Tone - humorous, joking	.59	1.56	2.05	2.32	3.22	2.62	5.94
39-4	Tone - firm, serious, concerned	.71	21.55	11.90	18.81	15.54	13.69	16.42
39-5	Tone - angry, hostile, harsh	.91	2.58	4.97	2.17*	3.39	.18*	.84
39-6	Tone - hurt	.42	--c		6.68	7.00	6.19	8.97
40-1	Technique - physical disapproval		.00		.00	.00	.00	.00
40-2	Technique - physical restraint	.01	--c		.71	1.60	.51	1.74
40-3	Technique - social shaming	.88	12.33	11.01	13.86	13.91	12.94	13.81
40-4	Technique - commanding conformance	.69	11.70	7.87	12.77	11.34	7.16	7.95
40-5	Technique - negative evaluation	.61	22.84	9.52	26.86	14.65	32.50	21.44
40-6	Technique - withdrawal of privilege	.22	--c		.66	1.48	3.66	11.03
40-7	Technique - withdrawal of love	.22	--c		1.08	2.07	1.50	5.47
40-8	Technique - veiled or explicit threat	.76	7.62	6.25	6.58	7.20	6.94	9.38

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*t test of difference between means significant beyond the .05 level.

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Table 9 (continued)

TSC Cat.	Behavior Description	Rel.	All Units Mean	All Units S.D.	To Boys Mean	To Boys S.D.	To Girls Mean	To Girls S.D.
Disapproval (continued)								
40-9	Technique - anonymous or impersonal warnings	.89	28.43	18.94	21.94	19.98	21.36	25.57
40-11	Technique - identification of causes, effects	.60	10.24	9.08	9.73	12.05	10.26	9.81
40-12	Technique - eliciting clarification in a non-threatening way	.60	4.29	3.31	5.81	6.02	3.13	4.30
41-0	Regarding - unclassifiable		--^{c}		.21	.67	.18	.81
41-1	Regarding - violation of rules	.84	17.29	12.27	14.82*	13.15	8.54*	8.60
41-2	Regarding - personal qualities, character	.72	2.09	3.46	2.82	4.42	1.16	2.67
41-3	Regarding - thoughtlessness	.21	--^{c}		13.48	12.91	5.81	7.31
41-4	Regarding - task mechanics	.30	--^{c}		3.75	3.90	3.61	4.41
41-5	Regarding - lack of knowledge, skill	.83	26.79	14.83	26.48*	15.69	40.77*	26.58
41-6	Regarding - lack of attention	.75	40.96	14.10	37.75	16.49	39.94	25.66
41-7	Regarding - housekeeping, neatness of desk, etc.	.13	--^{c}		.69	1.98	.00	.00
Instruction								
42-1	Source - teacher-centered, "I"	.78	8.90	4.78	7.39	5.55	5.29	4.95
42-2	Source - teacher-class, "We"	.81	6.77	3.90	4.65	4.60	3.02	3.33
42-3	Source - class-centered	.90	27.48	9.77	35.21	12.62	35.68	13.91
42-4	Source - convention	.93	53.33	10.77	51.63	11.50	55.04	13.26
42-5	Source - outside authority	.95	3.53	4.67	1.13	2.56	.97	1.42

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*_t_ test of difference between means significant beyond the .05 level.

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Table 9 (continued)

TSC Cat.	Behavior Description	Rel.	All Units		To Boys		To Girls	
			Mean	S.D.	Mean	S.D.	Mean	S.D.
Instruction (continued)								
43-0	Direction - unclassifiable		--c					
43-1	Direction - class as a whole	.94	37.42	15.37				
43-2	Direction - sub-group	.97	18.78	16.28				
43-3	Direction - boy	.89	24.61	10.05				
43-4	Direction - girl	.88	19.12	7.64				
46-1	Publicity - all or most hear or take notice	.98	59.40	21.38	42.76	22.73	44.97	20.95
46-2	Publicity - a few hear or take notice	.98	34.88	18.55	44.56	16.22	43.77	19.29
46-3	Publicity - no one else hears or takes notice	.91	5.72	4.96	12.68	10.77	11.26	11.20
47-1	Tone - normal tone of voice, unmoved	.96	90.15	9.85	86.85	15.06	88.94	8.43
47-2	Tone - accepting, pleasant, warm	.96	5.49	7.18	9.53	13.09	8.27	6.55
47-3	Tone - humorous	.12	--c		.19	.61	.32	1.23
47-4	Tone - firm, serious, concerned	.95	3.44	4.34	2.90	4.64	1.90	3.09
47-5	Tone - angry	.15	--c		.00	.00	.00	.00
47-6	Tone - hurt, pained, unhappy	.64	.40	.85	.53	1.44	.57	1.78
48-1	Technique - stating facts authoritatively	.83	36.74	8.25	28.40	10.26	29.21	10.92
48-2	Technique - commenting or suggesting in a non-authoritative manner	.88	4.57	3.10	6.38	4.98	5.92	8.31
48-3	Technique - explaining a process	.96	2.79	4.81	2.38	5.02	3.14	6.61
48-4	Technique - directing or requesting a discrete action	.83	21.71	8.91	21.12	10.75	20.96	9.81
48-5	Technique - evaluating, judging authoritatively	.64	5.90	2.97	4.85	4.10	5.18	4.61
48-6	Technique - eliciting a verbal response in an open-ended fashion	.86	14.02	5.46	21.20	8.89	20.03	8.54

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Table 9 (continued)

TSC Cat.	Behavior Description	Rel.	All Units Mean	All Units S.D.	To Boys Mean	To Boys S.D.	To Girls Mean	To Girls S.D.
Instruction (continued)								
48-7	Technique - eliciting a specific or solution that the teacher has in mind	.94	14.26	10.09	15.67	11.75	15.56	14.41
49-1	Regarding - factually reported subject matter	.84	46.29	14.06	42.47	13.58	45.88	20.52
49-2	Regarding - child's interests, interpretations, or experiences	.79	14.25	5.01	20.46	8.44	17.78	9.37
49-3	Regarding - classroom procedure, task mechanics, assignments	.88	31.44	12.09	25.49	12.46	27.15	15.60
49-4	Regarding - teacher's personal condition, interests, aims, ideas	.51	1.52	1.50	1.14	1.86	1.63	3.10
49-5	Regarding - peer relations, human relations in general	.74	.10	.26	.06	.27	.32	1.01
49-6	Regarding - social activities, school duties, social events	1.00	.36	1.57	.00	.00	.18	.84
49-7	Regarding - materials, resources, books, equipment	.87	5.13	4.39	9.86	7.11	5.97	7.13
49-8	Regarding - condition of other adults, other children	.06	--c		.52	.98	1.09	1.60
50-0	Sequential Reinforcement - neutral		45.31	11.28	23.69	10.69	28.20	14.90
50-1	Sequential Reinforcement - positive	.93	41.97	10.89	54.75	12.54	54.12	14.97
50-2	Sequential Reinforcement - negative	.66	12.72	4.64	21.56	9.26	17.68	9.75
Listening								
51-0	Direction - unclassifiable		--c					
51-1	Direction - class as a whole	.78	3.73	3.14				
51-2	Direction - sub-group	.80	3.25	3.23				
51-3	Direction - boy	.82	54.59	12.99				

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Table 9 (continued)

TSC Cat.	Behavior Description	Rel.	All Units Mean	All Units S.D.	To Boys Mean	To Boys S.D.	To Girls Mean	To Girls S.D.
Listening (continued)								
51-4	Direction - girl	.77	38.33	11.16				
54-1	Publicity - all or most hear or take notice	.96	43.85	21.81	41.93	23.52	45.83	23.30
54-2	Publicity - a few hear or take notice	.97	44.52	20.59	45.91	21.87	41.78	21.60
54-3	Publicity - no one else hears or takes notice	.87	11.59	6.70	12.16	6.92	12.40	8.41
55-0	Technique - unclassifiable		--[c]		.00	.00	.05	.23
55-1	Technique - attentive listening	.53	91.79	5.13	90.56	7.26	93.25	5.93
55-2	Technique - divided attention while listening	.54	8.13	5.05	9.44	7.26	6.70	5.90
56-0	Regarding - unclassifiable		--[c]		.16	.50	.29	.74
56-1	Regarding - factually reported subject matter	.96	37.65	19.00	37.49	21.74	37.05	20.02
56-2	Regarding - child's interests, interpretations, or experiences	.97	51.54	19.76	51.62	23.12	50.70	20.01
56-3	Regarding - classroom procedure, task mechanics, assignments	.84	7.56	4.96	7.40	7.06	8.83	5.43
56-4	Regarding - teacher oriented communications		--[c]		.16	.74	.16	.75
56-5	Regarding - peer relations, human relations in general	.88	.23	.69	.37	1.20	.05	.21
56-6	Regarding - social activities, traffic patrol, school duties, social events		--[c]		.07	.30	.10	.45
56-7	Regarding - materials, resources, books, equipment	.78	2.41	3.09	2.68	3.69	2.48	4.72
56-8	Regarding - condition of other adults, other children		--[c]		.05	.25	.33	.98
57-0	Sequential Reinforcement - neutral		36.43	11.86	35.33	12.22	36.70	14.36
57-1	Sequential Reinforcement - positive	.92	50.33	14.33	51.66	13.47	50.00	17.40
57-2	Sequential Reinforcement - negative	.83	13.20	5.73	13.01	6.19	13.29	7.70

Supporting the findings of Meyer and Thompson (1956) teachers were found to distribute significantly more approval and disapproval to boys in contrast to girls. In addition the teachers in this sample listened a significantly greater proportion of the time to boys. Table 10 gives the means, standard deviations, t ratios, and probability levels for the four molar categories of communication - approval, disapproval, instruction, and listening. It will be noted that the differences in the instructional category approach, but do not reach, the .05 level of significance.

Table 10

Means and standard deviations of percentage scores for the distribution of teacher approval, disapproval, instruction, and listening to boys and girls in the sample classrooms.

Category	To Boys Mean %	To Boys S. D. %	To Girls Mean %	To Girls S. D. %	t ratio	p
Approval	53.23	12.01	33.86	8.89	5.80	<.001
Disapproval	44.91	18.12	24.83	11.92	4.14	<.001
Instruction	24.61	10.05	19.12	7.64	1.94	<.06
Listening	54.59	12.99	38.33	11.16	4.25	<.001

In order to obtain data to decide whether other types of teacher-pupil transactions were significantly different with respect to boys and girls all units of transaction involving boys or girls individually were delineated and two new sets of percentage scores were computed. Means and standard deviations for these percentage scores (for boys and girls separately) have also been included in Table 9. Differences between the means for transactions involving individual boys and girls (separately) were tested with the t technique. Three significant differences were found - all with respect to disapproval. In Table 9 these differences have been noted with asterisks and involve categories 39-5 (angry or hostile tone of disapproval), 41-1 (disapproval regarding violation of rules), and 41-5 (disapproval regarding lack of knowledge or skill). Boys were the recipients of a significantly greater proportion of angry, hostile disapproval and were disapproved for violation of rules to a significantly greater degree than were girls. Girls, on the other hand, were found to be disapproved for lack of knowledge or skill to a significantly greater degree than were boys.

As a result of these findings (i.e., significantly different treatment of boys and girls) the percentage scores by sex of recipient for these three categories of disapproval were included in subsequent analyses.

Since a number of the categories in Table 9 failed to show a satisfactory level of internal consistency over episodes within the third morning, a selection of those having a consistency coefficient of .50 or greater was made. This selection plus the inclusion of the molar categories themselves resulted in 113 categories which formed the basis for later statistical treatment.

There was a need to reduce the number of variable dealth with for two reasons. First, the research hypotheses dealt with larger patterns of classroom behavior which involved a number of the sub-categories for which data had been obtained. Rather than select sub-categories to represent these patterns on a theoretical basis, with tenuous face validity, it seemed important to identify empirically the behavior patterns which were represented by the data obtained in the sample classrooms. Once stable factors or components of classroom teacher-pupil transaction were identified through statistical procedures, an attempt was made to describe them and match them with those behavior syndromes described by previous investigators.

Secondly, many of the percentage scores for molecular categories were artifactually related and a procedure which would combine categories to reveal readily the salient categories within each exhaustive set was needed.

These two types of interrelationships existing within the data were conveniently simplified by the use of factor analytic methods. An intercorrelation matrix was computed using the raw percentage scores[6] (113 by 113). This matrix was factored using the Centroid approximation of the principal-factor solution. Eighteen factors were obtained accounting for 97.64 per cent of the variance. The Centroid matrix was rotated by the Varimax method to approximate simple structure. The results of Varimax rotation of the eighteen factors are presented in Table 11.

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[6] Raw percentage and standardized scores (113 categories) for each of the twenty-one classrooms in the sample may be found in Appendix C.

The TSC category numbers at the left of the table identify the sets of artifactually related variables. The horizontal lines in the matrix separate these sets for easy identification. Within any one set negative loadings on some categories are balanced by positive loadings on others. Statistical independence was maintained between the sets marked off by the horizontal lines. Close inspection of these Varimax factors resulted in the identification of seventeen interpretable components of teacher-pupil transaction. The eighteenth factor accounts for only 1.6 per cent of the variance and has uninterpretable loadings of low order.

The TSC category designations may be identified by reference to the _Manual_ in _Appendix B_ or by the use of the brief descriptive words or phrases listed in Table 12.

This rather unorthodox use of factor analysis has provided an economy of description incorporating all the essential information in the original correlation matrix. The components of teacher-pupil classroom transaction identified by this factor analytic process are described in Table 13.

Table 11

Varimax factor solution for one hundred thirteen TSC categories based on initial Centroid solution[1]

TSC Cat. No.	Varimax Factors 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Communality h^2
25-1	-14	24	11	-01	29	03	33	15	09	-10	-08	51	16	-23	-29	-45	-04	14	991
25-2	20	42	42	11	13	09	-36	21	-07	15	-12	12	-01	45	30	06	11	08	975
25-3	-40	12	09	23	-18	29	08	11	-24	19	-19	04	18	-10	14	65	09	02	997
25-4	22	02	24	-30	37	-11	17	-28	-28	-47	08	-23	24	17	16	06	-18	14	994
25-6	01	-24	-38	-19	-21	-13	-40	18	39	25	-10	-23	-41	-02	-01	05	-04	-23	997
25-8	46	-34	-27	23	01	04	08	-36	15	-06	28	21	-11	-07	-26	-35	07	-09	960
26-1	-06	13	17	23	18	-16	31	03	44	66	20	05	02	05	03	11	-08	-07	965
26-2	-06	06	-05	06	21	-15	-32	-34	-18	38	-17	63	00	10	-15	08	-17	01	983
26-4	11	-13	-17	-23	-23	19	-12	05	-33	-73	-15	-20	03	-07	01	-14	13	06	968
27-2	24	21	-07	12	05	08	-33	28	-42	00	-24	12	-59	-09	02	04	23	-04	987
27-3	10	24	-21	-07	03	-06	24	-19	60	14	-09	-41	-04	25	-12	-05	-27	03	922
30-1	-90	07	-03	05	-04	04	-04	16	13	05	05	07	26	01	-12	14	-02	-10	990
30-2	89	-11	02	04	-02	03	-13	-12	-19	-09	-12	-15	-23	04	04	-02	10	08	987
30-3	34	10	03	-27	19	-21	50	-17	14	09	19	19	-17	-14	26	-37	-22	10	972
31-1	35	05	-41	07	-12	36	-08	15	-31	20	-16	-01	-05	33	-23	38	17	-09	983
31-2	-30	07	28	-26	09	-39	18	-16	34	-25	09	03	-19	-24	30	-37	-06	07	985
31-3	-14	-27	-18	40	07	01	-06	-14	-10	03	08	03	50	-39	-15	-27	-35	08	963
31-4	-03	-11	84	02	-01	-02	-24	27	16	-03	13	-03	14	15	05	19	06	-07	993
32-1	00	13	-12	-33	-17	12	-20	-04	-18	00	-56	-51	-13	11	-15	29	06	15	994
32-2	-02	-27	34	20	04	-04	-10	75	10	00	-13	12	-10	25	02	16	-13	-09	986
32-3	-14	-17	-14	14	01	00	-27	11	-01	00	25	83	15	-04	-20	-02	00	02	998
32-4	-38	02	-16	-11	-28	15	31	-04	03	-12	-65	18	09	-16	13	21	15	17	999
32-5	30	08	-19	15	37	14	16	-11	06	-20	64	-04	03	-19	10	-27	03	-10	954
32-6	-02	06	02	27	-21	-04	-06	-54	12	23	06	15	20	09	-04	-25	-27	-49	941
32-8	00	14	59	10	30	-34	24	-19	-20	25	22	-30	-11	11	16	-02	08	16	999
33-2	10	04	-22	44	-13	-03	-13	-57	03	03	34	04	27	05	19	-26	-12	-23	979
33-3	-21	-52	-15	-19	-05	30	62	-14	15	08	02	11	04	-12	-11	-07	13	19	996

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Table 11 (continued)

TSC Cat. No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	h^2
33-4	03	-06	43	-06	-03	-26	17	29	15	-44	-50	-10	05	-18	20	05	-10	-18	986
33-5	-04	31	00	-07	-13	-01	-56	34	-14	-03	-52	-03	-07	21	-07	29	01	-11	985
33-6	33	16	24	16	47	-13	13	-04	-09	02	66	-08	-09	-10	12	-04	-02	07	981
33-8	-21	-12	-18	-27	-23	-39	21	06	19	-05	18	01	-10	-28	-18	-52	-19	16	949
34-1	-26	03	25	73	-12	-01	19	-05	07	15	21	-16	17	17	-18	15	14	16	979
34-2	05	13	-25	38	-04	-07	-04	-43	19	06	05	31	07	25	-58	-08	-04	-12	993
34-4	18	-09	-08	-73	12	08	-14	23	-16	-13	-16	-02	-15	-23	39	-07	-09	-07	989
35-1	-09	-14	10	-06	-44	-29	38	05	43	-07	-39	19	-31	11	14	-12	-14	05	999
35-2	09	05	-13	-28	23	-16	09	-11	-04	-10	07	-08	-80	-02	01	19	-14	12	942
35-3	16	12	04	33	09	25	-19	06	47	09	22	12	57	-12	-08	12	19	-01	962
35-4	-17	-05	-05	-17	08	00	-15	-05	-88	00	02	-23	04	09	-03	-18	-03	-12	988
38-1	-57	06	22	15	-24	-18	03	17	18	27	-32	-05	02	01	-11	42	13	-18	967
38-2	60	-07	-25	-23	23	21	-08	-21	-17	-25	31	08	-08	-04	09	-28	-10	16	956
38-3	17	-01	-02	24	15	-03	21	06	-15	-19	23	-09	20	12	14	-75	-20	16	996
39-1	-14	05	-60	25	35	-36	-15	05	-14	-10	12	-16	01	29	-20	21	11	14	996
39-2	-30	-04	-12	10	-16	16	01	10	-05	-06	16	04	13	-84	11	08	-18	-01	994
39-3	-14	14	-14	49	03	-10	-24	-26	-27	11	05	-05	26	-08	08	-33	-49	05	963
39-4	09	-02	53	-44	-06	27	34	06	14	-11	-19	03	-06	-27	14	-28	14	-17	980
39-5Gp	47	-08	14	-15	-62	24	20	-09	09	25	01	-11	-27	-10	-04	12	-09	-08	954
39-5B	07	-05	45	-15	-48	-02	05	24	04	21	60	-02	02	05	-05	-14	-18	02	991
39-5G	-30	01	70	04	01	-07	-20	-07	12	20	35	-32	-05	11	07	15	15	-05	985
40-3	-02	24	12	39	-17	-04	-17	-15	-12	55	-01	06	-12	45	-03	33	-06	04	974
40-4	51	-03	00	-40	-14	41	03	-10	00	-18	22	-19	-11	-39	-22	-02	-09	-01	960
40-5	-05	-13	-12	-22	11	-06	-11	04	-31	12	27	29	10	-03	-75	03	12	05	962
40-8	15	44	32	26	18	-07	-24	-18	-18	10	44	01	14	06	-07	12	40	19	995
40-9	26	20	-07	35	03	13	-24	-02	-24	45	42	13	08	09	-38	21	-01	06	988
40-11	06	08	-37	68	17	-04	-11	32	15	16	09	03	02	06	28	-04	-27	-09	983
40-12	-27	-29	-03	-06	14	36	50	15	-07	03	-17	-16	38	-27	-03	-17	-17	-17	949
41-1Gp	03	09	29	-48	-14	-17	21	-19	35	-10	-13	08	-21	-10	03	-02	-22	42	900

(continued on next page)

Table 11 (continued)

TSC Cat. No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	h^2
41-1B	43	11	14	-27	-54	29	19	-22	09	18	00	-02	-04	-36	06	-01	-12	-07	948
41-1G	-01	22	31	-21	37	15	-06	26	20	-04	-25	-39	25	29	20	25	-06	-05	933
41-2	25	-09	13	65	22	-09	00	-38	29	24	21	-14	12	00	-04	02	-06	21	984
41-5Gp	-10	-34	-25	-09	-01	-12	-63	32	-04	24	06	11	05	-25	01	31	-01	-01	952
41-5B	-31	-12	-12	-24	09	-65	10	08	-14	-18	-02	-21	16	38	-23	-07	-04	-02	962
41-5G	-59	13	-22	-21	04	-30	-17	16	-07	-15	-26	-06	-13	-34	-15	08	26	08	954
41-6	34	00	07	21	17	30	-05	-24	-14	-26	29	46	00	41	22	-19	05	-10	992
42-1	-01	-12	10	69	24	16	07	02	31	31	-01	00	05	09	16	-19	-05	36	987
42-2	-06	03	02	33	36	24	-01	-06	36	08	08	62	-17	04	-21	-11	-04	-12	947
42-3	-17	27	01	-03	-76	-22	14	-12	-10	-24	-28	09	14	06	-19	07	12	-01	996
42-4	14	-24	04	-42	50	01	-15	10	-06	-02	35	-26	-09	-12	19	02	-42	-11	983
42-5	10	07	-23	05	-12	07	00	03	-28	17	-29	-12	01	03	-03	11	80	-01	955
43-1	-79	-01	-37	04	-12	23	07	-03	-04	02	-08	02	19	-08	-01	-32	-05	03	999
43-2	69	04	-07	00	-31	11	-29	16	-20	06	-11	15	-37	-05	-01	19	15	13	997
43-3	01	06	13	12	41	-42	29	-20	57	-01	22	-13	21	15	05	11	-09	-08	998
43-4	13	-13	71	-22	37	-13	11	-02	-23	-15	11	-21	12	07	-03	11	-11	-24	990
46-1	-90	10	-23	-02	-05	09	00	16	11	16	00	-14	02	-05	-05	-10	-10	-01	992
46-2	89	-11	19	-04	-09	-07	-08	-13	-12	-15	00	13	-02	07	01	18	13	00	990
46-3	54	00	26	24	54	-15	30	-20	-04	-15	02	10	-03	-07	18	-23	-07	01	999
47-1	21	00	-74	07	26	41	-04	01	-27	00	-02	08	15	16	-07	-05	-03	-12	989
47-2	-32	08	38	-12	-21	-56	18	-05	35	-02	03	-04	-17	-27	13	06	05	15	941
47-4	08	-15	89	01	-22	-05	-22	-02	03	02	-03	-10	-07	01	-09	-04	07	01	950
47-6	-21	08	64	10	-19	08	-02	20	22	10	23	00	00	46	13	24	-07	03	964
48-1	09	-08	-51	51	25	25	12	14	-07	30	-18	-12	26	-02	01	-19	-02	-11	959
48-2	-20	06	04	14	29	09	28	-04	73	-12	11	-10	-02	-30	-10	-09	04	22	965
48-3	-22	00	17	-05	-04	-13	-38	20	19	36	14	-39	-45	-09	-02	32	-20	08	979
48-4	32	-21	28	-54	45	11	-20	-11	-27	-17	21	15	-12	05	11	-13	03	-02	995
48-5	-08	04	06	26	23	-30	40	20	34	04	15	46	-04	-06	38	13	-09	06	960
48-6	02	17	-03	04	03	-70	44	07	32	-09	-24	-04	12	-09	01	-16	-01	-04	950

(continued on next page)

Table 11 (continued)

TSC Cat. No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	h^2
48-7	-18	13	08	-06	-75	20	-19	-20	-29	-20	-05	07	06	17	-18	20	11	00	987
49-1	-45	-05	06	-14	-74	17	-13	01	-11	08	-18	-29	05	-02	-02	06	11	07	987
49-2	-12	04	-17	19	-06	-59	46	-06	44	-02	-09	-11	25	-05	03	-18	01	04	963
49-3	57	06	-11	-10	63	09	-20	13	-09	-06	03	29	-16	16	02	04	-14	-03	996
49-4	10	08	03	85	01	-18	32	09	20	03	00	02	01	-02	19	03	-05	10	977
49-5	36	-20	13	73	27	-01	04	-10	24	-16	-03	08	-03	-15	-15	-15	01	02	969
49-6	25	-09	-15	84	13	-08	12	-13	18	-09	20	-16	06	-01	03	-09	-01	13	998
49-7	-15	-06	36	-18	53	-02	21	-24	00	-09	45	26	-06	-22	-08	-06	08	-28	997
50-0	-04	-05	-10	-03	-03	24	-85	-05	05	29	14	-12	-06	-06	-13	06	15	05	968
50-1	13	03	11	05	09	-24	80	-09	-04	-29	-11	-08	-08	-20	10	-05	-17	-04	951
50-2	-20	05	-01	-02	-13	-03	17	34	-05	-02	-08	49	34	63	06	-03	03	-04	977
51-1	-74	-15	10	09	-18	16	04	-01	-19	12	-21	02	32	10	06	22	11	11	922
51-2	34	11	-12	04	01	04	08	04	-61	-07	-08	16	-37	33	-07	30	27	06	987
51-3	11	06	-20	-17	17	-13	04	11	86	-09	20	-07	-04	11	-14	08	08	08	993
51-4	-02	-07	24	15	-14	09	-09	-15	-77	09	-15	02	06	-26	17	-23	-20	-14	988
54-1	-87	12	-03	14	05	-09	26	01	15	01	-07	-10	21	04	-06	18	06	04	997
54-2	85	-13	11	-18	-11	11	-28	-07	-18	-02	01	15	-20	-03	06	06	03	01	998
54-3	24	00	-24	11	19	-04	02	17	08	03	20	-14	-05	-04	00	-78	-28	-15	977
55-1	-36	-08	25	08	-14	-13	38	-72	-06	05	-05	-02	17	-07	-21	-01	-08	-01	998
55-2	36	08	-27	-09	15	13	-39	70	06	-04	05	00	-17	05	21	00	09	01	998
56-1	-02	18	24	-17	-11	-05	-76	-07	-14	-31	-23	-16	20	-04	02	09	12	-04	983
56-2	03	-04	-39	08	-09	02	78	02	12	30	21	15	-06	05	-10	-12	-07	03	979
56-3	08	-37	19	15	45	07	-06	26	-06	-11	-16	02	-44	03	31	07	-37	07	965
56-5	16	-03	-27	79	25	-12	-12	01	06	12	11	-19	-20	-09	08	-03	-15	16	999
56-7	-15	-31	50	-08	47	09	-17	-16	18	19	26	14	-11	-07	-05	11	29	-14	946
57-0	01	-03	-11	-10	01	03	-82	02	-01	-09	36	-13	-01	11	17	14	18	12	970
57-1	-02	-08	14	10	20	-01	79	01	12	-01	-34	04	-08	-30	-08	-15	-07	-04	961
57-2	04	28	-12	-04	-51	-03	-27	-08	-29	21	09	17	21	50	-14	09	-19	-15	981
Variance	11.0	2.5	8.0	8.7	7.4	4.4	8.7	4.6	7.1	4.0	5.5	4.5	4.1	4.4	3.0	4.7	2.9	1.6	

Table 11 (continued)

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[1] These Varimax factors are based upon approximately 600 to 700 observations in each of twenty-one elementary school classrooms. Each observation was categorized using eight molar categories of behavior. Units of behavior classified into the first four categories were further categorized employing five to seven additional sub-molar categories. The sub-molar categories of behavior were further encoded using two to eleven molecular categories. Horizontal independence was maintained by the use of percentage scores within molar, sub-molar, and molecular categories. Artifactual vertical correlation from molar, to sub-molar, to molecular categories varies according to the degrees of freedom present at each level. A maximum of 22 degrees of freedom exists for the classification of any single unit of behavior.

The method of factor analysis employed here was used, not to establish underlying behavior factors to be generalized to the population of teachers, but as a convenient technique to identify patterns of responses within molar categories (chains of relationship) and show relationships occurring between them in the current sample.

Each of the scores used in the factor analysis had reliability coefficient (internal consistency over episodes within a full morning of observation) of at least .50, with the median value approximately .82.

Table 12

Identification of TSC categories used in the Varimax Factor Solution

TSC Category	Category description
Molar behavior	
25-1	Overtly approving
25-2	Overtly disapproving
25-3	Instructing, demonstrating, lecturing
25-4	Listening (in communication)
25-6	Engaged in personal activity
25-8	Observing, watching, surveying
Approval	
26-1	Source - teacher-centered, "I"
26-2	" - teacher-class, "We"
26-4	" - convention
27-2	Direction - sub-group
27-3	" - boy
30-1	Publicity - all or most hear or take notice
30-2	" - a few hear or take notice
30-3	" - no one else hears or takes notice
31-1	Tone - normal tone of voice, unmoved
31-2	" - accepting, pleasant, warm
31-3	" - humorous, joking, good natured
31-4	" - firm, serious, concerned
32-1	Technique - emphasizes, repeats
32-2	" - evaluates positively, praises
32-3	" - elicits group attention
32-4	" - redefinition plus
32-5	" - gives verbal or non-verbal support, encourages
32-6	" - takes role of equality
32-8	" - offers or gives special privilege
33-2	Regarding - personal qualities, character
33-3	" - personal interpretations, ideas, judgments
33-4	" - planning, organization
33-5	" - correct or accurate knowledge, skill
33-6	" - attention to task assigned, effort
33-8	" - personal interests of pupil

(continued on next page)

Table 12 (continued)

TSC Category	Category description
Disapproval	
34-1	Source - teacher-centered, "I"
34-2	" - teacher-class, "We"
34-4	" - convention
35-1	Direction - class as a whole
35-2	" - sub-group
35-3	" - boy
35-4	" - girl
38-1	Publicity - all or most hear or take notice
38-2	" - a few hear or take notice
38-3	" - no one else hears or takes notice
39-1	Tone - normal tone of voice, unmoved
39-2	" - accepting, pleasant, warm
39-3	" - humorous, joking, good natured
39-4	" - firm, serious, concerned
39-5 Gps.	" - angry, hostile, harsh
39-5 Boys	" - angry, hostile, harsh
39-5 Girls	" - angry, hostile, harsh
40-3	Technique - social shaming, sarcasm
40-4	" - commanding conformance
40-5	" - negative evaluation
40-8	" - veiled or explicit threat to do harm
40-9	" - anonymous or impersonal warnings
40-11	" - identification of causes and effects
40-12	" - eliciting clarification in a non-threatening way
41-1 Gps.	Regarding - violation of rules
41-1 Boys	" - violation of rules
41-1 Girls	" - violation of rules
41-2	" - personal qualities, character
41-5 Gps.	" - lack of knowledge, skill
41-5 Boys	" - lack of knowledge, skill
41-5 Girls	" - lack of knowledge, skill
41-6	" - lack of attention or effort
Instruction	
42-1	Source - teacher-centered, "I"
42-2	" - teacher-class, "We"
42-3	" - class-centered
42-4	" - convention
42-5	" - outside authority

(continued on next page)

Table 12 (continued)

TSC Category	Category description
Instruction (continued)	
43-1	Direction - class as a whole
43-2	" - sub-group
43-3	" - boy
43-4	" - girl
46-1	Publicity - all or most hear or take notice
46-2	" - a few hear or take notice
46-3	" - no one else hears or takes notice
47-1	Tone - normal tone of voice, unmoved
47-2	" - accepting, pleasant, warm
47-4	" - firm, serious, concerned
47-6	" - hurt, pained, unhappy
48-1	Technique - stating facts authoritatively, lecturing
48-2	" - commenting or suggesting non-authoritatively
48-3	" - explaining a process through several steps
48-4	" - directing or requesting a discrete action
48-5	" - evaluating subject matter, judging authoritatively
48-6	" - eliciting a verbal response in an open-ended way
48-7	" - eliciting an answer the teacher has in mind
49-1	Regarding - factually reported subject matter
49-2	" - child's interests, interpretations, ideas
49-3	" - classroom procedure, task mechanics, assignments
49-4	" - teacher's personal condition, interests, aims
49-5	" - peer relations, human relations in general
49-6	" - social activities, school duties, social events
49-7	" - materials, resources, books, equipment
50-0	Sequential Reinforcement - neutral
50-1	" " - positive
50-2	" " - negative

(continued on next page)

Table 12 (continued)

TSC Category	Behavior description
Listening	
51-1	Direction - class as a whole
51-2	" - sub-group
51-3	" - boy
51-4	" - girl
54-1	Publicity - all or most hear or take notice
54-2	" - a few hear or take notice
54-3	" - no one else hears or takes notice
55-1	Technique - attentive listening, eyes on speaker
55-2	" - divided attention while listening
56-1	Regarding - factually reported subject matter
56-2	" - child's interests, interpretations, ideas
56-3	" - classroom procedure, task mechanics, assignments
56-5	" - peer relations, human relations in general
56-7	" - materials, resources, books, equipment
57-0	Sequential Reinforcement - neutral
57-1	" " - positive
57-2	" " - negative

Table 13

Components of teacher-pupil transaction

1. Observant and small group facilitative, emphasizing appropriate task procedures and social relations through semi-autonomous, semi-private small group process
2. Dominative through use of shame, ridicule, and threat
3. Firm, dominative control with emphasis on paying attention, proper planning, and the use of appropriate procedures and resources
4. Good natured, personalized control with concern for sources of error, character, self-control, and proper social relations
5. Calm, acceptant transactions in general with private, individualized instruction and a concern for divergency, attention to task, and the use of task appropriate procedures and resources
6. Businesslike lecture method with insistence upon attention to task and conformity to rules of procedure
7. Supportive, receptive, responsive transactions regarding pupil ideas and concerns
8. Self-centered and judgmental transactions emphasizing acceptable skill, knowledge, and planning
9. Warm, open transactions with boys and a general avoidance of transaction with girls
10. Formal group instruction with control through shame, ridicule, or admonition
11. Observant-controlling, emphasizing attention to task and encouraging pupils' use of own abilities
12. Acceptant-supportive-evaluative, with an appeal to group authority and responsibility
13. Highly verbal and good-humored transactions with individuals or the class as a whole and an avoidance of small-group process
14. Unresponsive transactions with grim domination regarding rules (girls), skill or knowledge (boys), and paying attention (boys and girls)

(continued on next page)

15. Acceptant, controlling through standards, with appeal to convention as the source of authority, and avoiding negative evaluation
16. Cold, impersonal public instruction emphasizing knowledge and skill and the use of shame or ridicule as a means of control
17. Humorless transactions with control through threat and an appeal to outside authority in instruction

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These descriptive statements of components of teacher-pupil transaction are based upon a careful inspection of the Varimax loadings, paying attention to the numerous artifactual relationships within each exhaustive set of sub-categories. Each descriptive phrase has been worded to reflect - on the basis of face validity - the salient response categories within each set and the factor as a whole.

The next step in the analysis was to obtain component scores for each of the twenty-one classrooms. The formula employed in this process was provided by Kaiser (1962) and bears the notation "22" in that reference (p.86). The formula reads:

$$X = B' \; F \, M^{-2} \, F' \, Z$$

where: X = matrix of standardized component scores
B' = transpose of the Varimax matrix
F = is the Centroid matrix
M = diagonal matrix of latent roots
F' = transpose of the Centroid matrix
Z = matrix of standardized observed scores

The resulting standardized component score matrix is presented in Table 14.

Table 14

Matrix of standardized component scores[a]

Class No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
03	.03	-.05	-1.33	-.56	-.59	.99	-4.04	3.58	-1.03	2.15	-1.57	-.82	-2.93	.95	.12	3.24	.46
04	1.77	-.66	-1.34	6.97	4.70	-2.19	4.58	-3.73	4.01	1.01	5.25	.76	1.81	-1.06	.26	-5.10	-3.18
05	-2.57	2.08	4.54	.86	-.84	-1.84	-1.66	.12	1.61	2.49	.97	-2.06	.32	2.21	-.23	3.73	1.66
06	-2.39	.32	1.25	-.95	.03	-5.44	5.71	-.50	5.00	-2.11	-1.26	-1.54	-1.43	-2.69	1.06	-2.06	-1.65
07	-1.64	-.70	-.46	.98	-.02	.39	2.16	.42	1.78	.52	-.59	-.17	.59	-.82	.12	-.61	-.48
08	-2.48	2.39	-.42	-.06	-4.30	1.18	-2.72	.84	-3.07	1.30	-3.79	-.08	.41	2.85	-1.45	4.97	4.57
09	1.48	1.79	.08	-1.76	-.58	.33	-2.42	.94	-1.05	-1.32	-1.12	-1.19	-1.61	1.63	.11	2.33	2.14
10	-2.75	-2.09	-.52	-.93	-.86	1.39	1.44	.29	-.62	-.75	-1.52	-.78	2.27	-2.70	.08	-1.17	-1.29
11	.67	-2.03	-.15	1.57	2.54	.45	1.63	-1.26	1.69	.83	2.54	3.18	.43	-1.40	-.44	-1.81	-.70
12	.13	.86	-.83	.79	-1.62	1.23	-1.20	-2.00	-1.98	.98	-.05	1.53	1.88	1.73	-.77	-.66	-.88
13	1.16	-1.75	-.59	-1.16	-.23	1.98	-2.68	.54	-2.20	-.68	.62	.96	.04	-.29	-.44	.34	.97
14	-2.52	1.41	-.26	.49	-.89	-.85	-1.05	1.35	.63	1.09	-1.39	-1.27	1.67	2.11	-.30	1.83	.41
15	2.72	.66	-.84	-2.67	-1.86	3.31	-4.62	1.64	-3.92	-.53	-1.79	-.15	-1.97	1.19	-.50	3.15	3.85
52	-2.89	1.17	-.61	-.22	-1.79	.29	.52	-.34	.04	-.73	-1.30	-.64	1.75	-1.07	-.38	.31	.87
53	-2.15	2.41	.35	2.18	-1.26	-.53	-.98	2.12	.55	2.08	-1.23	1.67	1.04	3.75	-.43	2.82	.92
54	2.78	-.68	.09	.42	3.03	-.05	2.41	-1.57	1.00	-.61	3.15	1.83	-.16	-1.66	.51	-3.65	-1.82
55	3.13	-.79	1.99	-3.61	.07	.45	-.68	1.26	-1.49	-2.85	-1.68	-.56	-2.48	-.70	1.18	.03	.09
56	.98	-.93	-.05	-1.06	-1.14	.04	1.17	-1.15	.89	.17	.20	-.82	-1.47	-1.58	.12	-.83	-1.08
57	4.24	-2.60	.39	-2.96	3.59	-.37	1.47	-1.00	-1.13	-3.51	1.74	-.46	-2.03	-1.57	1.18	-3.18	-1.88
58	.00	-1.52	-1.11	-.02	1.42	-1.00	3.20	-1.85	.73	-1.87	1.94	-.35	1.51	-2.38	.69	-5.35	-3.32
59	.65	2.36	.50	1.86	.90	-1.66	.29	-1.77	.00	.82	1.06	.15	.26	1.59	.00	-.06	-.56

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[a] Means equal zero, standard deviations equal one.

At this point a means was available for testing the research hypotheses. The component scores obtained for each of the twenty-one classrooms provided a measure of the degree to which each of the teachers were observed to behave in the manner indicated by the factor descriptions. In addition, the B weights resulting from the multiple regression equations provided an index of the degree to which each "classroom condition" was related to the target pupil variables. With these two sets of "scores" and scores for the various general characteristics of the research classrooms an intercorrelation matrix (Table 15) was computed. These correlations provide the basis for an evaluation of the research hypotheses. The variables entering into the intercorrelation matrix (Table 15) have been identified in Table 16. Reference must be made to Table 13 for complete descriptions of the seventeen components of transaction.

Tests of the research hypotheses.

Hypothesis 2. A teacher-pupil transactional pattern representing the "integrative" teacher behavior syndrome identified by Anderson (1939) is associated with superior pupil originality, cognitive flexibility and higher overall self-concept.

Anderson's concept of "integrative" behavior appears to encompass several of the transactional components identified in this study.

> If, instead of compelling the companion to do as one says, one asks the companion and by explanation makes the request meaningful to the other so that the other can voluntarily co-operate, such behavior is said to be an expression not so much of pursuing one's own unique purposes as of attempting to discover common purposes. For such expenditure of energy

Table 15

Intercorrelation matrix of general classroom characteristics, components of teacher-pupil transaction, and indicas of pupil self concept, creative thinking, and academic achievement

2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Var. No.
-36	-02	03	-37	-43	-12	-52	-25	-12	-05	21	20	-09	01	-16	03	-09	21	-46	08	-29	-28	46	-23	44	35	-10	05	-10	10	1
	43	-31	25	-06	-45	48	21	48	-11	-38	08	-15	27	43	-03	06	43	40	-35	20	09	-74	73	-62	-19	-47	-24	31	-24	2
		-02	25	12	-30	07	-10	16	-23	12	-24	21	00	36	-18	-09	10	19	-41	32	32	-34	40	-34	-17	-38	-06	-14	-58	3
			-45	24	30	-06	08	-29	-05	40	-48	24	-41	-06	-01	03	-30	13	-06	21	29	21	-03	42	35	38	53	13	16	4
				13	-28	27	-23	21	-09	-36	13	15	33	14	-19	-27	-01	14	00	09	00	-29	18	-46	-22	-21	-34	-23	-32	5
					52	-08	29	-10	49	-35	16	-07	25	-37	30	-10	-52	-14	54	-20	-11	00	-26	-27	-48	09	-23	-26	00	6
						-44	-12	-25	56	25	-04	-24	-26	-48	45	29	-55	-22	43	-36	-21	48	-68	18	-19	11	-14	-19	16	7
							27	19	-57	-15	-41	28	-10	52	-43	-22	10	81	-50	68	60	-71	49	-49	-10	-20	-07	02	-16	8
								-18	-05	-41	00	08	21	00	-04	-37	-21	16	23	25	15	-40	19	-27	-24	02	-03	14	18	9
									35	-36	37	-49	56	61	56	39	62	14	-26	-26	-33	-25	33	-29	-19	-55	-28	-10	-53	10
										-36	62	-59	51	-30	89	33	-01	-52	62	-80	-75	39	-34	04	-38	-11	-24	-20	-01	11
											-69	38	-84	06	-30	28	-07	21	-48	36	49	41	-13	44	39	15	37	09	10	12
												-70	82	-33	55	09	30	-72	56	-84	-82	16	-17	-05	-23	-10	-36	-10	-01	13
													-45	17	-77	-31	-42	45	-19	78	66	-18	19	-05	07	21	20	-02	11	14
														08	50	-04	23	-41	41	-51	-63	-16	16	-37	-38	-34	-41	-22	-30	15
															-03	19	34	63	-69	49	30	-46	61	-42	-08	-49	-06	05	-53	16
																43	22	-39	33	-75	-70	32	-20	04	-20	-25	-14	-12	-16	17
																	27	01	-28	-28	-17	09	-03	15	08	04	19	24	-12	18
																		03	-42	-23	-23	-07	44	10	30	-21	12	26	-09	19
																			-64	79	69	-63	43	-34	-08	-20	06	11	-13	20
																				-61	-65	37	-48	01	-29	19	-33	-26	35	21
																					92	-52	42	-21	04	-04	20	09	-11	22
																						-37	22	-03	11	06	30	06	-10	23
																							-59	56	22	23	08	-17	26	24
																								-46	11	-27	13	43	-09	25
																									57	58	64	10	31	26
																										44	64	45	25	27
																											66	41	56	28
																												42	25	29
																													55	30

NOTE: Decimal points are omitted. Variable identification may be found in Table 16.

Levels of significance: (N = 21)

when r (two-tailed)	(one-tailed)	then p
≥.43	≥.37	≤.05
≥.54	≥.51	≤.01
≥.64	≥.62	≤.001

Table 16

Identification of variables in Table 15

Variable No.	Identification
1.	SMSG experimental classroom (0 if no, 1 if yes)
2.	Grade level (4 if fourth, 6 if sixth)
3.	Sex of teacher (0 if female, 1 if male)
4.	Class size (actual number of pupils in the class)
5.	Proportion of boys in the class
6.	Activity level of children in the class (4 point scale, 0 low - 3 high)
7.	Teacher-pupil transaction component No. 1 (see Table 13)
8.	Teacher-pupil transaction component No. 2
9.	Teacher-pupil transaction component No. 3
10.	Teacher-pupil transaction component No. 4
11.	Teacher-pupil transaction component No. 5
12.	Teacher-pupil transaction component No. 6
13.	Teacher-pupil transaction component No. 7
14.	Teacher-pupil transaction component No. 8
15.	Teacher-pupil transaction component No. 9
16.	Teacher-pupil transaction component No. 10
17.	Teacher-pupil transaction component No. 11
18.	Teacher-pupil transaction component No. 12
19.	Teacher-pupil transaction component No. 13
20.	Teacher-pupil transaction component No. 14
21.	Teacher-pupil transaction component No. 15
22.	Teacher-pupil transaction component No. 16
23.	Teacher-pupil transaction component No. 17
24.	Index of mean height of pupil self concept (SC Mn)
25.	Index of differentiation of pupil self concept (SC SD)
26.	Index of reading gain (STEP)
27.	Index of mathematics gain (STEP)
28.	Index of creative thinking - flexibility (Kaya Puzzles Test)
29.	Index of creative thinking - problem-solving (Kaya Puzzles Test)
30.	Index of creative thinking - synthesis (Kaya Puzzles Test)
31.	Index of creative thinking - originality (Kaya Puzzles Test)

> in common purposes, for an attempt to reduce instead of augment or incite conflict, the term socially integrative behavior is used. A person changing his mind when confronted with the new evidence which has grown out of the experience of another is said to be integrating differences. Integrative behavior is consistent with the scientific point of view, the objective approach (1945, p. 9).

In a subsequent report (Anderson & Brewer, 1946) two types of socially integrative teacher behavior were operationally defined.

> IN, Integration with no evidence of working together.
>
> These contacts are initiated by T. In them T is in no way using force, coercion, or other pressure on the child. The contacts are mainly exploratory, of the sort one would use in trying to arouse an expression of interest by another. When T asks questions or makes suggestions the child has freedom to express interest or disinterest; he may accept or decline. In advance of the contacts, it is not apparent that there is either conflict between T and child or interest of the child in the subject initiated by T. It sometimes happens that a contact is erroneously recorded under IN, that what appeared as freedom of choice was not freedom to choose. In such cases the domination is recorded in the subsequent teacher contacts.
>
> Many statements or questions recorded as IN contacts will not be different per se from . . . (the) Lecture method, but in IN contacts there will be no evidence of a demand by T that the child display interest. The teacher may have a goal or problem, but it is not apparent that she expects a child to accept that goal or problem. The child has given no specific evidence that he is interested in what the teacher says, or that he wants to do that which is suggested, The choice is left with the child (p. 25).
>
> IT, Integration with evidence of working together
>
> There must be some evidence of direction of goals for both teacher and child. Child is "in" the situation; he has given some indication of interest or desire. In all IT contacts the child, as a person, is "accepted as he is." The incorrectness of his solution to any problem or the quality of his performance does not affect adversely his status of being accepted as an individual. He can, therefore, "make mistakes without blame." This type of

> contact is that indicating the closest rapprochement of child and teacher. When there is objective evidence of joint participation toward a common goal, a contact is recorded as *IT*. The situation may have originated with the teacher, but the child must have accepted the activity without evidence of coercion from the teacher (p. 27).

Anderson and Brewer break these two gross categories into several sub-categories.

> *IN*-18, *Extends invitation* (always initiated by T, in contrast with IT-18).
>
> *IN*-19q, *Question* regarding possible, though not expressed (in contrast with *IT*-19q) interest or activity of child. Many contacts in this category are those in which T is asking for information.
>
> *IN*-19s, *Statement* regarding possible, though not expressed (in contrast with *IT*-19s), interest or activity of child.
>
> *IT*-14, *Helps child to define, redefine, or advance a problem* Contacts recorded under *IT*-14 ranged from telling a child a word in a reading lesson to helping him work out a complex social relationship. There must be evidence that the problem has been stated or accepted by the child. This category includes both questions and statements.
>
> *IT*-16, *Approval, accord, thanks, acceptance* of the *spontaneous* or *self-initiated behavior of the child*. Approval where there can be several answers or new answers.
>
> *IT*-18, *Extends invitation* in response to child's expressed wish, suggestion, or need.
>
> *IT*-19q, *Questions regarding the child's expressed interest or activity* which do not contribute to a problem of the child's (IT-14), or which do not merely express approval (IT-16). Many contacts in this category are those in which T is asking for information.
>
> *IT*-19s, *Statements regarding the child's expressed interest or activity* which do not contribute to a problem of the child's (*IT*-14), or which do not merely express approval (*IT*-16). Story reading by the teacher would be recorded under *IT*-19s when there is evidence of the children's interest.

IT-20, Admits responsibility for own act that is inconvenient, unjust, or unfair to another, or admits own ignorance or incapacity (pp. 26-30).

Categories of the TSC which parallel to degree the categories described by Anderson and Brewer are listed below. The selections were made on the basis of protocol statements published by Anderson and Brewer (1946, pp. 26-30) and, therefore, assumptions regarding tone or mood were made on the basis of the situational cues provided.

TSC 25-1	Overtly approving; supportive statements or actions
TSC 42-2	Teacher-class source of authority - "We." The teacher shares her authority with the class and encourages the children to cooperate. The children have some freedom of decision but the teacher identifies herself as sharing it rather than delegating it.
TSC 42-3	Class-centered source of authority. The teacher identifies the class or some member of the class as the source or seat of authority, value, responsibility, or ownership. She may appeal to the judgment or personal experience of the class or members of the class, delegate the responsibility to make a choice, or act as the agent of the child.
TSC 31-2	Accepting, pleasant, sympathetic, warm, interested; smiling, enthusiastic while approving
TSC 39-1	Normal tone of voice and manner while disapproving
TSC 39-2	Accepting, pleasant (etc.) while disapproving
TSC 47-1	Normal tone of voice and manner while instructing
TSC 47-2	Accepting, pleasant (etc.) while instructing
TSC 33-2	Aspect of behavior approved: personal qualities, disposition, vivacity, exuberance, enthusiasm, honesty, character; genetic attributes, intelligence; personal rights, rights to comfort, consideration, equality of treatment; rights to hear and to know what is expected; rights to happiness, enjoyment of humor, pleasure; personal dignity

TSC 33-3	Aspect of behavior approved: personal interpretations, ideas, judgments; evaluations, suggestions; cleverness, humor (ability to create humor); personal contribution in a discussion, sharing, etc.; creativity, thoughtfulness, awareness, sensitivity, imagination
TSC 33-8	Aspect of behavior approved: personal interests (outside of school or extracurricular); personal experiences, family activities or interests; personal possessions, hobbies
TSC 40-12	Technique of disapproval - eliciting clarification of a situation in a non-threatening way; teacher elicits clarification of goals, needs, errors, defects in performance; elicits child's evaluation performance, child's agreement with teacher's evaluation (not rhetorical); elicits confirmation of teacher's understanding of child's reasoning, ideas, purposes
TSC 48-2	Commenting or suggesting in a non-authoritative manner; expressing ideas, possibilities, hypotheses, predictions, tentative answers or solutions (error admitted as possible or probable); expressing doubt, asserting lack of adequate knowledge; offering alternative ways of working
TSC 48-6	Eliciting a verbal response in an open-ended fashion; eliciting a choice, hypothesis, prediction, possible solution, possible way of proceeding; eliciting a confirmation of an hypothesis; eliciting a response within certain limits (with some degree of freedom); eliciting a judgment, opinion, interpretation; eliciting child's condition, need, interests, problems
TSC 49-2	Instruction regarding child's interests, interpretations, or experiences; pupil interpretations of subject matter where no fixed body of knowledge is extant; teacher statements or questions regarding condition or status of child or class; regarding pupil interests, knowledge, judgment, needs, plans, desires, values, goals, comfort, psychological set, personal experiences, family experiences, possessions
TSC 56-2	Listening regarding the same material as in 49-2 above

TSC 50-1 Positive sequential reinforcement while instructing - the teacher proceeds in such a manner as to reinforce by her programming the immediately previous behavior of the child or the class. The teacher may move from one question to another with each new question signalling the acceptance by her of the immediately previous response.

TSC 57-1 Positive sequential reinforcement while listening (same process as that described in 50-2 but occurring during a listening sequence).

An examination of the loadings for these TSC categories (representing the "integrative" behavior categories of Anderson and Brewer) indicated that one transactional component identified in this study (No. *7*) very closely resembled "socially integrative behavior" and three others (Nos. *5*, *9*, and *12*) had several elements in common. Table 17 gives the factor loadings for the four components.

Component *7* has only four negative loadings and in each case an alternate behavior category within the same exhaustive set appears on the list of "integrative" behaviors - with each carrying a positive loading. Thus, teachers high on Component *7* were observed to approve more for *ideas and judgment* than for *personal qualities*, to disapprove more frequently in a *warm or pleasant manner* than in a *normal or unmoved* fashion, to *appeal to the class or the group as a source of authority* rather than assert a shared teacher-class authority, and to instruct in a *warm or accepting tone* rather than in a *normal, unmoved* manner. These alternative categories, with positive loadings, are if anything more closely identified with the integrative syndrome than the categories bearing negative signs.

Table 17

Loadings on TSC categories representing "socially integrative" teacher behavior for four components of transaction

TSC No.	Category description	Component Number 5	7	9	12
25-1	Overtly approving	.29	.33	.09	.51
31-2	Tone of approval - warm, pleasant	.09	.18	.34	.03
33-2	Approval regarding personal qualities	-.13	-.13	.03	.04
33-3	Approval regarding ideas, judgments	-.05	.62	.15	.11
33-8	Approval regarding personal interests	-.23	.21	.19	.01
39-1	Disapproval tone - normal	.35	-.15	-.14	-.16
39-2	Disapproval tone - warm, pleasant	-.16	.01	-.05	.04
40-12	Disapproval technique - eliciting clarification in a non-threatening way	.14	.50	-.07	-.16
42-2	Source of authority in instruction - teacher-class, "We"	.36	-.01	.36	.62
42-3	Source of authority in instruction - class-centered	-.76	.14	-.10	.09
47-1	Tone or mood of instruction - normal	.26	-.04	-.27	.08
47-2	Tone or mood of instruction - warm, pleasant, accepting	-.21	.18	.35	-.04
48-2	Instruction technique - commenting or suggesting non-authoritatively	.29	.28	.73	-.10
48-6	Instruction technique - eliciting an open-ended response, choice, hypothesis	.03	.44	.32	-.04
49-2	Instruction regarding pupil interests	-.06	.46	.44	-.11
50-1	Positive sequential reinforcement while instructing	.09	.80	-.04	-.08
56-2	Listening regarding pupil interests	-.09	.78	.12	.15
57-1	Positive sequential reinforcement while listening	.20	.79	.12	.04

Components *5*, *9*, and *12* have many positive loadings on the list of "integrative" teacher behavior and therefore may be considered to be relevant in a test of the hypothesis. The correlations obtained for each of these four components are presented in Table 18.

Table 18

Correlations of components of transaction representing "socially integrative" behavior with pupil self concept, cognitive flexibility and originality

		Target pupil variables			
Component identification	Var. #	SC Mn 24	SC SD 25	Flex 28	Orig 31
5. Calm, acceptant, individualized - with concern for attention to task	11	.39[a]	-.34	-.11	-.01
*7. Supportive, receptive, responsive regarding pupil ideas and concerns	13	.16	-.17	-.10	-.01
9. Warm, open transactions with boys and a general avoidance of girls	15	-.16	.16	-.34	-.30
12. Acceptant, supportive, evaluative, with appeal to group authority, responsibility	18	.09	-.03	-.04	-.12

[a] Significant at the .05 level of confidence (one-tailed test)

*Indicates component most closely resembling the "integrative" behavior syndrome on the basis of protocol comparisons.

Non-significant results were obtained for Component *7*, as well as for *9* and *12*. However, relationships observed for Component *5* gave some support. *Height of self concept* was found to be significantly correlated ($r = .39$, $p < .05$) with Component *5* - *calm*, acceptant transactions in general with private, individualized instruction and a concern for divergency, attention to task, and the use of task appropriate procedures and resources.

None of the four components were found to be significantly correlated with cognitive flexibility or originality.

Hypothesis 3. A teacher-pupil transactional pattern representing the "learner-supportive" behavior syndrome identified by Withall (1948) is associated with superior pupil originality, cognitive flexibility, and higher overall self concept.

There are close parallels in Withall's concept of a "learner-supportive" climate with the "socially integrative behavior" defined by Anderson. Withall described "learner-supportive" behavior in terms of teacher questions or statements "that express agreement with ideas, actions or opinions of the learner, or that commend or reassure the learner" (1952, p. 440).

> Agreement is frequently expressed by a monosyllabic response such as "Yes," "Right," "Uhuh," and the like. Commendation or reassurance may be stated in terms of
>
> a) class-accepted criteria or goals, or
> b) the private goals and subjective criteria of the teacher.
>
> The dominant intent of these statements or questions is to praise, encourage or bolster the learner (p. 440).

Five categories of the TSC, in combination, seemed to represent the type of teacher behavior described in the foregoing paragraph.

TSC 25-1	Overtly approving, supportive statements or actions
TSC 32-2	Evaluates responses, behavior, or performance of child or class in a positive way; makes a judgment of value or of the quality of behavior carrying greater approbation than under category *32-1* (repeats, agrees); praises; expresses liking or gratitude for action or response of child or class
TSC 32-3	Elicits group attention, calls attention to an approved behavior, holds up a product of some child or group for all to see (in approbation)
TSC 32-5	Gives verbal or non-verbal support, encouragement; shows appreciation verbally or non-verbally; expresses confidence, enjoyment; shows affection with expression, gesture, or physical contact; gives assistance in finding something in a book (not instructing or demonstrating); gives gratuitous cues to an answer, provides an answer when child is stammering, or has made an acceptable attempt to respond; smiles or laughs while child is communicating with the teacher, or when the class has responded exuberantly to some event; complies with a request for help; walks toward a child whose hand is raised for assistance
TSC 32-7	Expresses sympathy with child, gives reassurance; shows understanding; gives a pat on back, smiles at a child having trouble; shows sympathy for effort made; shows concern for problems, comfort; elicits condition of child or class - e.g., comfort, fatigue

Anderson's category *IT-16* (*approval, accord, thanks, acceptance*) would include most of these teacher behaviors provided the approval was in response to the "spontaneous or self-initiated" behavior of the child. Withall's "learner-supportive" category is broader, including approval for pupil behavior which is in response to teacher initiated goals and teacher-set standards or rules.

Inspection of the loadings on components of transaction obtained in this study indicated that two (Components *5* and *12*) had generally positive loadings on the categories in question - while at the same time had relatively lower loadings on TSC category 25-2, overt disapproval. Three other components with sizable positive loadings or with a favorable approval-disapproval ratio were 7, 8, and 13. Three of these components were examined in connection with Hypothesis 2; they are listed again in Table 19 along with Components 8 and 13.

Table 19

Loadings on TSC categories representing "learner-supportive" teacher behavior for five components of transaction

TSC No.	Category description	Component Number 5	7	8	12	13
25-1	Overtly approving	.29	.33	.15	.51	.16
*25-2	Overtly disapproving	.13	-.36	.21	.12	-.01
32-2	Evaluates positively, praises	.04	-.10	.75	.12	-.10
32-3	Elicits group attention with favor	.01	-.27	.11	.83	.15
32-5	Gives support, encouragement	.37	.16	-.11	-.04	.03

NOTE: Category 32-7 - expresses sympathy, gives reassurance had an internal consistency coefficient of .07 and was dropped from the present phase of the study for that reason.

*This category (25-2) has been included to show the relative amount of disapproval associated with the components under consideration.

Perhaps the component which most closely satisfied the Withall description was Component 12. A relatively large loading on approval (.51) with correspondingly low disapproval (.12) and an emphasis upon eliciting group attention with favor (.83) and upon praise (.12) appeared to make an acceptable match. Enough elements of the pattern of support were present in the other components to warrant their inclusion in a test of the hypothesis (Table 20).

Table 20

Correlations of components of transaction representing "learner-supportive" behavior with four target pupil variables

		Target pupil variables			
Component identification	Var. #	SC Mn 24	SC SD 25	Flex 28	Orig 31
5. Calm, acceptant, individualized - with concern for attention to task	11	.39[a]	-.34	-.11	-.01
7. Supportive, receptive, responsive regarding pupil ideas and concerns	13	.16	-.17	-.10	-.01
8. Self-centered, judgmental emphasizing skill, knowledge, planning	14	-.18	.19	.21	.11
*12. Acceptant, supportive, evaluative, with appeal to group authority	18	.09	-.03	-.04	-.12
13. Highly verbal and good-humored, avoiding small group process	19	-.07	.44[b]	-.21	-.09

[a] Significant at the .05 level of confidence (one-tailed test)

[b] Significant at the .05 level of confidence (two-tailed test)

*Indicates component most closely resembling the "learner-supportive" behavior on the basis of category descriptions.

The findings with respect to Hypothesis 3 gave a small amount of support with respect to height of self concept. No relationships with cognitive flexibility or originality were revealed. The one component which most closely matched the category description ("learner-supportive") was uncorrelated with all three target variables predicted to bear a positive relationship.

One of the less closely matched components (Component 13 - highly verbal and good-humored transactions with individuals or the class as a whole and an avoidance of small-group process) bore a significant ($r = .44$, $p < .05$, two-tailed test) relationship with differentiation of self concept (SC SD). This result suggested that this type of teacher-pupil transaction (i.e., represented by Component 13) resulted in greater pupil differentiation among strengths and weaknesses in the school situation without an appreciable decrement in height of self-concept. However, since sixth grade teachers exhibited a greater amount of behavior of this type ($r = .43$) and since upper grade children in general showed greater differentiation of self concept ($r = .73$), the finding with respect to Component 13 (Table 20; SC SD) may be relatively unimportant behaviorally.

Hypothesis 4. A teacher-pupil transactional pattern representing the behavior of the academically oriented teacher identified by Bush (1954) is associated with superior reading and mathematics achievement.

Bush describes the academic type of teacher (Type A') in the following manner:

> The teacher classified as Type A' is most clearly distinguished by the nature of his purposes. He conceives of his task in well-defined terms and limits himself to the development of one aspect of personality, namely the intellectual side. There is little uncertainty in his own mind about his function. In his view, he is employed as a teacher of, for instance, English, or science, or history, his responsibility being to teach students the most significant facts and generalizations of the subject-matter discipline in which he has been trained. He may or may not demand or anticipate equal attainment from each pupil, although he frequently refers to the high standards which he requires from all pupils at all times. Type A' tends to maintain firm control over the classroom situation by rather direct methods, taking a central, responsible, and controlling role upon the slightest provocation. This type of teacher relies for his control of pupils upon the social distance between individuals on different levels in the institutional hierarchy. He preserves and exploits to the utmost the institutional prestige afforded him by the office of "teacher." He uses this powerful social control to realize his aims. He may approach pupils with a friendly reserve or a vitriolic, sarcastic, and abusive attitude, using whichever, in his opinion, will teach the most subject matter, or whichever his own personality drives dictate; or from time to time, he may shift from control through pleasantness to control through fear. The classroom attitude which prevails in the personal relations between teacher and pupil is "stick to business." Personal matters may be attended to outside of class. The curriculum is detailed and specific, following the logical analysis of the subject-matter field. Emphasis is upon mastery of information, generalizations, and skills outlined in advance. There is usually drill of some type for everyone. Many of the activities and techniques are planned and carried out in a similar manner for the class as a whole. A large percentage of the time is scheduled with required activities, so that the pupil knows clearly what he should do. Lectures, research, and writing predominate. The teacher emphasizes the importance of advanced training and of productive scholarship or craftsmanship in his subject. He may have acquired advanced degrees or he may have had wide practical experience in developing requisite skills in the field. The teacher assumes that he must be a master in his field far beyond even the best student if he is to impress his students, hold their respect, and tutor them properly (1954, pp. 174-175).

Inspection of the factor matrix indicated that one of the components obtained (Component *16*) had loadings which matched to a considerable degree the types of behavior described by Bush. *Overt approval* was low (-.45) and a moderate amount of *disapproval* (.06) was present as a means of control. The greatest amount of time was devoted to *instruction* (.65) with a minor emphasis on *listening* (.06) and *personal activity* (.05). *Observation* of the children while they worked was not a characteristic (-.35). Approval was distributed in a *normal tone* (.38) or *firmly* (.19) and *publicly* rather than in *private* (-.37). Approval was indicated by *agreement* (.29), *positive evaluation* (.16), or *redefinition plus* (.21) for correct *knowledge or skill* (.29) - but not for the *personal interests* of the children (-.52). Disapproval occurred in *public* (.42) in a *normal* (.21) tone, devoid of *humor* (-.33). *Shaming, ridicule* (.33) or *anonymous warnings* (.21) were preferred with a minor use of threat (.12). Disapproval was given for *lack of knowledge or skill* (.31) generally, with some emphasis with girls on *conformity to rules* (.25). While instructing there was an emphasis upon the *explanation of processes* or *proper procedures* (.32) and the *elicitation of specific answers* (.20). *Listening* to a child in *private* was rare (-.78), with most communications a class or group affair. A degree of social distance was maintained through an avoidance of a *role of equality* (-.25) and through a lack of concern for *pupil* interests while *instructing* (-.18) and *listening* (-.12).

Correlations obtained for Component 16 with pupil gains in reading and mathematics are given in Table 21.

Table 21

Correlations of a component of transaction representing the "academically oriented" type of teacher with pupil gains in reading and mathematics achievement

	Target pupil variables		
Component identification	Var. #	Reading 26	Math. 27
16. Cold, impersonal public instruction emphasizing knowledge and skill and the use of shame or ridicule as a means of control			

The predictions regarding relationships with "academically oriented" teacher behavior were unsupported by the results obtained in this study. Reading and mathematics gains were not significantly related with the transactional component which most closely resembled the "academic" type of teacher described by Bush.

Hypothesis 5. A teacher-pupil transactional pattern representing the counseling type of teacher behavior identified by Bush is associated with higher pupil overall self concept.

> The teacher characterized in this classification (counseling) may be contrasted in many ways with Type A'. His purposes are broad and usually less well defined. His statements concerning what he is trying to do for pupils are often phrased in vague terminology. He is concerned with the growth and development of all aspects of personality; and if there is any special emphasis, it is upon the individual's emotional and social development. This teacher is less concerned with the specific subject matter which pupils learn or know

> than with their feelings and behavior. The subject matter is of secondary importance, instrumental at best, to be departed from when required by pupils' needs. His objectives vary from pupil to pupil. Type B' exerts control less directly and requires less conformity in classroom behavior. Controls are maintained more often by the use of group pressures exerted by the class, under the supervision of the teacher who remains in the background. The teacher intervenes less to redirect energies which are going "astray." Type B' tries to break down the natural reserve between teacher and pupil, between adult and youth. His success as a teacher, he believes, depends upon the extent to which he is able to establish a close, personal, friendly rapport with pupils, to become a confidant, and to learn about the private factors which generate pressures in their lives. He tries to be friendly and approachable to all of his students and may even conceive of his most important work as taking place outside of the classroom, where he can associate informally with them on a person-to-person basis. The curriculum, or subject matter, and its organization are flexible. Pupils enter into planning, and their problems constitute the core of the curriculum. The functional relationship of the subject matter to everyday living is emphasized. The expressed interests and preferences of pupils are directly taken into account. The classroom procedures tend to be informal and individualized. The pupil is free from supervision, so that he has greater opportunity to choose his activities. Activities are inclined to be more manipulative and less verbal. This type of teacher expresses a different attitude toward subject matter than does Type A', for Type B' considers himself as a guide to help the individual in all of his growth processes. He is willing to work with pupils in almost any field of knowledge and, if he is unfamiliar with the subject, to explore and learn with them. The teacher who exhibits this willingness-to-learn attitude may be well trained and highly competent, or he may be a novice. He tries to break down the awe with which pupils are inclined to look upon teachers. He fosters the idea that teachers can be wrong, that they do not know all of the answers, and that in some instances pupils may know more than the teachers. (1954, pp. 176-177).

As might be expected Anderson's broader concept of "socially integrative" behavior was considered the "counseling" type described by Bush. The one component identified in this study which most closely resembled the behavior of the Type B' teacher is Component 7. Among the molar categories, approval (.33) and listening (.17) have the highest positive loadings. Disapproval (-.36) and personal activity (-.40) are not characteristics of the teachers in the sample who have high scores on this component. Approval tends to be given in private (.50) in a personal way through the use of positive redefinition (.31), encouragement (.16), and the giving of special privileges (.24), with an emphasis on pupils' ideas (.62), personal interests (.21), planning (.17), and effort or attention to task (.13), rather than skill or knowledge (-.56). Disapproval, though low (-.36), is directed when it does occur primarily toward the class as a whole (.38) with preference given to asking for a clarification of the situation in a non-threatening way (.50) and focusing upon standards or rules of procedure (.21) rather than lack of knowledge or skill (-.63). Instruction tends to be conducted in private (.30) in a warm manner (.18) using techniques such as commenting or suggesting (.28), evaluating or judging (.40), or eliciting responses in an open-ended way (.44). Teachers high on this component of transaction are concerned in instruction with pupil interests, ideas, and problems (.46), with sharing their own ideas and interests (.32), and with discussing resources available to the pupils (.21). While listening, full attention is given to the speaker (.38), with encouragement given to the pupil to express his own needs, problems, and concerns (.78).

Positive sequential reinforcement is provided both during instructional sequences (.80) and while listening (.79).

Correlations's obtained with Component 7 are given in Tables 18 (and also 20). A positive correlation with height of self concept (.16) was found, but it could readily have occurred through the operation of chance alone.

Hypothesis 6. A teacher-pupil transactional pattern representing the behavior of teachers oriented toward fostering creativity in pupils, as identified by Bush, is associated with superior pupil originality and cognitive flexibility.

Bush describes this type of teacher in the following manner:

> The type of teacher who falls into this classification is less easily described than either A' or B' who are opposites in many respects. While A' and B' conceive of their educational purposes in terms of all of the pupils with whom they work and think that they will probably be successful at least to some extent with all, C' considers that he will probably achieve his purposes for only a few pupils. His purposes are quite narrow in one sense: he is trying to touch off a creative spark which will give a student energy, freedom, and skill to express his own unique and creative spirit. This teacher is not interested in all aspects of the personality of the pupil but in only that one in each pupil which he wants to develop to a very high degree of competence. This teacher does not consciously neglect the other parts of the individual; but in his devoted attention to one area, he fails to see the need for the others. He believes that some, and perhaps many, pupils have, somewhere, a creative potential which, if discovered, released, and nurtured, will enable them to be creative and imaginative artists - in the broad sense of the term - and that his function as a teacher is to uncover and nourish that potentiality. Thus his purpose is well defined, specific, and unique for each pupil. His methods of control are likely to vary from extreme domination to complete freedom and may be most clearly seen in his manner of working with individuals rather than with groups. He may

be unmercifully harsh and demanding at the one time in his requirements for drill, discipline, and concentration, but then again allow the individual to follow his own urges and use his own devices at will. With those pupils in whom he senses the possibility of awakening the creative spark, his personal relations tend to be quite intimate. His acceptances and rejections of pupils are likely to be unusually swayed by personal feeling. The social distance between himself and those few with whom he feels he has a mission is reduced to a minimum between adult and youth. The teacher may even foster the feeling that the pupil is more competent in some specifics than the teacher. His personal relations with pupils may fluctuate markedly from time to time, either because the teacher plays upon the emotional relationship to obtain the behavior which he desires in the pupil or because neither the teacher nor the pupil can control the relationship which is so highly charged emotionally. The regular curriculum, whether formal and predetermined or informal and planned with pupils, is used to fill the gaps when the more exciting business of individual exploration and discovery is quiescent. The regular curriculum is followed according to the general policy of the school but is departed from the moment an individual shows the slightest sign of special interest and creativity. The classroom activities and teaching procedures of Type C' teacher are as varied as his pupils; there are frequently not one or two things going on in the classroom but one, two, or three dozen different things, with as many individuals working on different projects as there are separate interests. His procedures do not require that all pupils have a similar activity at the same time to "keep the class together." The work is individualized, informal, and involves a minimum of group work. The individual pupil is busily engaged in studying, exploring, and making something in that area in which his creative potential lies. Everything revolves around that. This type of teacher is usually a skilled or competent artisan in one or several fields or, if not, has an unusually deep appreciation and sensitivity. The teacher may confine his efforts, energies, and talents to one area, or he may distribute them over many fields. These fields may or may not coincide with the subject he teaches. Even when he teaches a subject in which he has not previously demonstrated creative work, he approaches it with an artistic and emotional point of view. Much of his insight, understanding, and learning is intuitional. His approach to his own learning and to his teaching is likely to be more that of the artist than of the scholar (1954, pp. 177-179).

Because of the apparent lack of consistency or pattern in the behavior of the Type C' teacher, as described by Bush, the approach used in the present investigation is somewhat inappropriate. Regularities in teacher-pupil transactions were sought out and where behavior was erratic over episodes within the third morning categories were dropped from the analysis. Another problem in attempting to test for the relationships with the "creative" type of teacher classroom behavior is the relative infrequency of the type in the normal population. Bush gives figures that suggest the incidence to be not more than 4 per cent.

In the present sample one teacher appeared to represent to some degree the "creative" type of teacher. He displayed many of the erratic qualities and the lack of concern for conventional instructional methods and subject matter that Bush describes. However, his interests were more frequently related to social adjustment and character than to artistic effort or creativity. The component scores obtained for this teacher (T-04) are given in Table 22. His overall component score profile and the impressions received by the two observers who gathered the data in the sample classrooms suggest that he, among all the teachers in the sample, most closely resembles the Type C' (creative) teacher described by Bush.

Since no one component among the seventeen derived in the study appears to represent the major characteristics of the "creative" type of teacher only a limited test of the hypothesis can be

Table 22

Component scores for Teacher 04, representing the "creative" type of teacher

Component number and description	Component score[a]
1. Observant and small group facilitative, emphasizing appropriate task procedures and social relations through semi-autonomous, semi-private small group process	1.77
2. Dominative through use of shame, ridicule, and threat	-.66
3. Firm, dominative control with emphasis on paying attention, proper planning, and the use of appropriate procedures	-1.34
4. Good natured, personalized control with concern for sources of error, character, self-control, and proper social relations	6.79
5. Calm, acceptant transactions in general with private, individualized instruction and a concern for divergency, attention to task, and the use of task appropriate resources	4.70
6. Businesslike lecture method with insistence upon attention to task and conformity to rules of procedure	-2.19
7. Supportive, receptive, responsive transactions regarding pupil ideas and concerns	4.58
8. Self-centered and judgmental transactions emphasizing acceptable skill, knowledge, and planning	-3.73
9. Warm, open transactions with boys and a general avoidance of transaction with girls	4.01
10. Formal group instruction with control through shame, ridicule, or admonition	1.01
11. Observant-controlling, emphasizing attention to task and encouraging the use of the pupils' own abilities	5.25
12. Acceptant-supportive-evaluative, with an appeal to group authority and responsibility	.76

(continued on next page)

Table 22 (continued)

Component number and description	Component score[a]
13. Highly verbal and good-humored transactions with individuals or the class and an avoidance of small-group process	1.81
14. Unresponsive, with grim domination regarding rules and attention to assigned tasks	-1.06
15. Acceptant, controlling through standards, with appeal to convention as the source of authority, and avoiding negative evaluation	.26
16. Cold, impersonal public instruction emphasizing knowledge and skill, using shame or ridicule as a means of control	-5.10
17. Humorless transactions with control through threat and an appeal to outside authority in instruction	-3.18

[a] Standardized score with mean of zero and standard deviation of one.

made. On the basis of *one* teacher and the analysis made of his classroom transactions some measure can be made regarding relationships with pupil *originality* and cognitive *flexibility* in comparison with pupil performance in the other twenty classrooms in the sample. Table 23 presents the *B* weights obtained for the two target pupil variables for Teacher *04*.

Table 23

Relationships of pupil cognitive flexibility and originality with presence in the classroom of Teacher 04 - a teacher oriented toward fostering "creativity" in children

Target pupil variable	B weights
Creative thinking - flexibility	-.3889*
Creativity thinking - originality	-.7333*

*Figure represents the largest negative weight obtained for the target variable in question.

The results in Table 23 failed to provide any support for the hypothesis. Instead, they provided evidence that just the contrary effect had occurred - that the behavior of the Type C' teacher was negatively related to cognitive flexibility and originality as measured by the Kaya Puzzles Test. No statistical test of the B weights reported in Table 23 was readily available, but some appreciation of the value to be attributed to them can be gained by a comparison with the B weights obtained in the same regression equations for the mental ability measure (SCAT). These figures were .3887 and .4757 for cognitive flexibility and originality, respectively. Thus, the weightings given to placement of a child in Classroom 04 in accounting for his scores in tests of flexibility and originality were as great or greater than the weighting given to his mental ability score - but with negative signs.

Since the description given by Bush suggested that Type C' teachers frequently had their greatest success with a relatively few children, an examination was made of the standard deviations within the research classrooms on the tests of flexibility and originality.

Results given in Table 24 indicate that the relationships observed with respect to flexibility and originality were general and individual differences among the children in Classroom 04 were near the mean for all classes except for flexibility in girls, where a very high degree of homogeneity prevailed.

Table 24

Ranges of standard deviations for tests of flexibility and originality for boys and girls by classes in comparison with the standard deviations obtained for boys and girls in Classroom 04

	Standard Deviations			
	BOYS		GIRLS	
Class or group	Flexibility	Originality	Flexibility	Originality
All classrooms	4.08 - 9.01	5.34 - 14.83	2.42 - 7.71	2.69 - 12.46
Classroom 04	5.61	9.16	2.42	8.46

The findings with respect to Hypothesis 6 suggest that, contrary to prediction, the behavior of the "creative" type of teacher as described by Bush (1954) was negatively correlated with cognitive flexibility and originality, and that the relationship was general with respect to the children involved. Individuals within the classroom of the "creative" teacher did not, on the strength of this study, have greater heterogeneity in *flexibility* and *originality* than children in the population from which they were drawn.

Hypothesis 7. Teacher classroom behavior characterized by a relatively *high degree* of private or semi-private communication with children, of overt facilitation of task oriented behavior, of concern for divergent responses in children, of attentiveness to pupil needs, of the use of control techniques involving humor - and a relatively *low degree* of negative evaluation, of domination through threat, of firmness in tone, of teacher-supportive control, of harsh "taskmaster" behavior, and of grim domination - is predicted to be associated with superior pupil reading achievement, mathematics achievement, originality, cognitive flexibility, and higher overall self concept.

A number of components of transaction were relevant to the hypothesis under consideration. Table 25 presents the behavioral characteristics listed in the hypothesis and the components obtained in the present study which bore a close relationship on the basis of a careful inspection of the loadings on each of the factors.

Four components of transaction, *1*, *5*, *7*, and *15*, were predicted to be correlated positively with the target variables in the hypothesis and eight, *2*, *3*, *6*, *10*, *11*, *14*, *16*, and *17*, were predicted to be negatively correlated. The findings with respect to these twelve components are presented in Table 26.

Table 25

Components of transaction related to teacher behavior predicted to be positively and negatively correlated with superior pupil reading achievement, mathematics achievement, originality, cognitive flexibility, and higher overall self concept

Behavior characteristics	Relevant Components of Transaction
Predicted to be positively correlated	
Private or semi-private communication	1, 5
Overt facilitation of task oriented behavior	1, 5
Concern for divergent responses in children	5, 7
Attentiveness to pupil needs	7
Avoidance of negative evaluation	15
Predicted to be negatively correlated	
Domination through threat	2, 17
Firmness in tone	3
Teacher-supportive control	10
Harsh "taskmaster" behavior	6, 11
Grim domination	14, 16

Table 26

Correlations of twelve components of transaction with pupil self concept, reading and mathematics gains, cognitive flexibility, and originality

Component identification*	Var. #	Target pupil variables SC Mn 24	 Read 26	 Math 27	 Flex 28	 Orig 31
Predicted to be positively correlated						
1. Observant, small group facilitative - semi-private	7	.48[a]	.18	-.19	.11	.16
5. Calm, acceptant, individualized transactions	11	.39[a]	.04	-.38	-.11	-.01
7. Supportive, receptive, responsive regarding ideas	13	.16	-.05	-.23	-.10	-.01
15. Acceptant, controlling through convention, avoiding negative evaluation	21	.37[a]	.01	-.29	.19	.35
Predicted to be negatively correlated						
2. Dominative through shame, ridicule, and threat	8	-.71[c]	-.49[a]	-.10	-.20	-.16
3. Firm, dominative control emphasizing attention	9	-.40[a]	-.27	-.24	.02	.18
6. Businesslike lecture method, insisting upon attention	12	.41	.44[d]	.39	.15	.10
10. Formal instruction, controlling through shame, ridicule	16	-.46[a]	-.42[a]	-.08	-.49[a]	-.53[b]
11. Observant-controlling - emphasizing attention to task	17	.32	.04	-.20	-.25	-.16
14. Unresponsive, grim regarding rules, attention to task	20	-.63[c]	-.34	-.08	-.20	-.13
16. Cold, impersonal, emphasizing knowledge and skill	22	-.52[b]	-.21	.04	-.04	-.11
17. Humorless, controlling through threat, appealing to outside authority	23	-.37[a]	-.03	.11	.06	-.10

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*Refer to Table 13 for more complete descriptions

[a] Significant at the .05 level(one tail)

[b] Significant at the .01 level(one tail)

The results presented in Table 26 gave strong support for the hypothesis with respect to pupil *height of self concept*. Nine of the correlations (out of twelve) were found to be in the predicted direction and significant at or beyond the .05 level of confidence. Results obtained with two components, *6* and *11*, approached significance in a direction contrary to prediction (using a two tailed test). Both of these components represented the concept "harsh taskmaster behavior". One of the two (Component *6*, *businesslike lecture method, insisting upon attention*) was positively correlated with all five target pupil variables listed in Table 26, reaching significance (.05 level of confidence, two tailed test) in the case of *reading* gains.

Moderate support for the hypothesis with respect to gains in *reading* achievement was provided by the correlations obtained. Two components of transaction (*2*, *dominative through shame, ridicule, and threat*; and *10*, *formal instruction, controlling through shame, ridicule*) were found to be significantly negatively correlated as predicted. As was mentioned above, a significant correlation with *reading* gains was obtained for Component *6* (*businesslike lecture method, insisting upon attention*) - contrary to prediction.

Results obtained for *mathematics* gains were generally contrary to prediction, though none of the correlations reached significance using a two tailed test. Values approaching significance suggested a negative relationship existed between *mathematics* gains and "calm, acceptant, individualized transactions", and a positive relationship existed with a "businesslike lecture method, insisting upon attention to task and conformity with rules of procedure."

Support for the hypothesis with respect to cognitive flexibility and originality was given primarily by the results obtained with Component 10 (formal instruction, controlling through shame, ridicule). Significant negative correlations (-.49 and -.53) were obtained with flexibility and originality, respectively. The pattern of relationships obtained with the remaining components of transaction in Table 26 was generally in accordance with predictions, but it provided little support that was reliable.

In summary, strong support for Hypothesis 7 was provided with respect to height of self concept, moderate support was given in the case of gains made in reading achievement, and slight support was provided regarding cognitive flexibility and originality. Gains in mathematics achievement were not significantly correlated with the components of teacher-pupil transaction which were employed in testing the hypothesis (using a two tailed test) - and some indication was provided that the behavior syndrome described in Hypothesis 7 was negatively correlated with mathematics gains.

Hypothesis 8. A teacher-pupil transactional pattern representing "democratic" leader behavior, as identified by Lewin, Lippitt, and White (1939), is associated with superior pupil reading and mathematics achievement, cognitive flexibility, originality, and higher overall self concept.

The methods used to create a "democratic" group atmosphere were summarized by Lewin, Lippitt, and White in the following way in their 1939 report:

> 1. All policies a matter of group discussion and decision, encouraged and assisted by the leader.
>
> 2. Activity perspective gained during first discussion period. General steps to group goal sketched, and where technical advice was needed the leader suggested two or three alternative procedures from which choice could be made.
>
> 3. The members were free to work with whomever they chose, and the division of tasks was left up to the group.
>
> 4. The leader was "objective" or "fact-minded" in his praise and criticism, and tried to be a regular group member in spirit without doing too much of the work (p. 273).

A more detailed description of "democratic" leader behavior was provided by White and Lippitt in a later book (1960). On the basis of statistical analyses of the verbatim records and interpretive commentaries kept during the Iowa experiments, several statistically significant characteristics of the "democratic" leaders were delineated (pp. 31-49). These behavior characteristics, along with their approximate TSC category equivalents, are given in Table 27.

Three of the components of transaction derived in this study bore many elements in common with the "democratic" leader behavior described by Lewin, Lippitt, and White. Descriptions of the appropriate categories and the loadings obtained for these three components are given in Table 28.

Table 27

Characteristics of "democratic" leader behavior[a] with approximate TSC category equivalents

Characteristic	Autocratic %	Laissez-faire %	Democratic %	TSC Category Equivalent
1. Orders, directives	45	4	3	48-4*
2. Disrupting commands	11	1	1	40-4*
3. Nonobjective criticism	5	1	2	40-5*
4. Praise	11	5	7	32-2**
5. Guiding suggestions	6	14	24	48-2
6. Giving information	15	49	27	48-1** 48-3**
7. Stimulating self-direction	1.2	13	16	42-3 48-6 50-1 50-2* 57-1 57-2*
8. Jovial and confiding behavior	0.7	1.7	7	31-2 31-3 33-8 47-2 48-6 49-2 49-5 49-6 55-1 56-2 56-5
Categories not reported in terms of percentages				
9. Enforcing limits by explanation of reasons				40-11
10. Equalitarian behavior				32-6

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[a] From White & Lippitt, 1960, pp. 31-46.

*Percentages characteristically low in "democratic" behavior

**Percentages characteristically moderate in "democratic" behavior

Table 28

Loadings on TSC categories representing "democratic" leader behavior for three components of transaction

TSC		Component		
No.	Category description[a]	4	7	15
	Categories in which negative loadings are appropriate			
40-4	Commanding conformance	-.40	.03	-.22
40-5	Negative evaluation	-.22	-.11	-.75
48-4	Directing, requesting action	-.54	-.20	.11
50-2	Negative sequential reinforcement while instructing	-.02	.17	.06
57-2	Negative sequential reinforcement while listening	-.04	-.27	-.14
	Categories in which small positive loadings are appropriate			
32-2	Evaluates positively, praises	.20	-.10	.02
48-1	Stating facts in an assured manner	.51	.12	.01
48-3	Explaining a process through several steps	-.05	-.38	-.02
	Categories in which high positive loadings are appropriate			
31-2	Accepting, warm, pleasant while approving	-.26	.18	.30
31-3	Humorous, joking, good natured	.40	-.06	-.15
32-6	Takes role of equality	.27	-.06	-.04
33-8	Approves personal interests of pupils	-.27	.21	-.18
40-11	When disapproving identifies causes and effects	.68	-.11	.28
42-3	Instructs appealing to class as source of authority	-.03	.14	-.19
47-2	Accepting, warm, pleasant while instructing	-.12	.18	.13
48-2	Commenting or suggesting non-authoritatively, expressing possibilities	.14	.28	-.10
48-6	Eliciting a response in an open-ended way	.04	.44	.01
49-2	Instructing regarding child's interests	.19	.46	.03
49-5	Commenting regarding peer relations	.73	.04	-.15
49-6	Commenting regarding social activities	.84	.12	.03
50-1	Positive sequential reinforcement while instructing	.05	.80	.10
55-1	Attentive listening	.08	.38	-.21
56-2	Listening regarding child's interests	.08	.78	-.10
56-5	Listening regarding peer relations	.79	-.12	.08
57-1	Positive sequential reinforcement while listening	.10	.79	-.08

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[a] Complete descriptions may be found in Appendix B (TSC Manual)

Of the three components which bore closest resemblance to the "democratic" pattern of leader behavior, Components 4 and 7 had the fewest loadings with signs contrary to the pattern derived from an analysis of the White and Lippitt (1960) protocols. The third component, 15, had many loadings of low order and about one-half of the signs were contrary to the appropriate pattern (as derived); however, the largest loadings were in the expected direction and on that basis the component was included in the test of the hypothesis. Results for Hypothesis 8 are given in Table 29.

Little support was found for the hypothesis with regard to height of self concept. Only in the case of Component 15, the least well matched of the three, was a significant positive relationship with self concept obtained. Non-significant correlations of low order with all target variables were obtained for Component 7, which has been reported on before an element of the "integrative" and "learner-supportive" syndromes. Results obtained for Component 4 - on which Teacher 04, the "creative" teacher, had the highest score of all the teachers (6.79, Table 22) - was found to be significantly negatively correlated with flexibility and originality using a two tailed test.

In terms of the overall test of the hypothesis (giving greater weight to the two most well matched components - 4 and 7) the results not only failed to give support, but showed a significant negative relationship with cognitive flexibility and originality.

Table 29

Correlations of components of transaction representing "democratic" leader behavior with pupil self concept, reading and mathematics achievement gains, cognitive flexibility, and originality

			Target pupil variables				
	Component identification	Var. #	SC Mn 24	Read 26	Math 27	Flex 28	Orig 31
*4.	Good natured, personalized control with concern for sources of error, character, self-control, and proper social relations	10	-.25	-.29	-.19	-.55[b]	-.53[b]
*7.	Supportive, receptive, responsive transactions regarding pupil ideas and concerns	13	.16	-.05	-.23	-.10	-.01
15.	Acceptant, controlling through standards, with appeal to convention as the source of authority, and avoiding negative evaluation	21	.37[a]	.01	-.29	.19	.35

[a] Significant at the .05 level of confidence (one tailed test)

[b] Significant at the .05 level of confidence (two tailed test)

*Indicates components most closely resembling "democratic" leader behavior on the basis of protocol comparisons.

Relationships of general classroom characteristics to components of teacher-pupil transaction. In a previous section of this report the relationships of general classroom characteristics to the target pupil variables were investigated. Significant relationships of *grade level to height of self concept, differentiation of self concept*, gains made in *reading* achievement, and cognitive *flexibility* were observed. At this point the relationships of specific components of teacher-pupil transaction to *grade level*, as well as other situational variables, will be reported.

Correlations of general classroom characteristics - use of *SMSG* mathematics curriculum, *grade level*, *sex of teacher*, *class size*, *proportion of boys* in the class, and *activity level* of the children in the classroom - with the seventeen components of transaction derived in this study are given in Table 30.

Teachers in the SMSG classrooms were observed to be significantly less *dominative-threatening* (Component *2*) and display significantly less *grim domination* (Component *14*). Earlier (Table 7) it was noted that pupils in the SMSG classrooms had significantly higher *self concepts* and made greater gains in *reading*. *Mathematics* gains were also positively correlated with *SMSG* at a level approaching significance ($r = .35$, $p = .06$). It had been suggested earlier that general behavior patterns of the fourth grade teachers may have been responsible for the significant relationships of *height of self concept* and *reading* rather than the SMSG programming since nonsignificant partial correlations (.32 and .15 for *height of self*

Table 30

Relationships of classroom characteristics to components of transaction

		General classroom characteristics					
Component of transaction[a]	Var. #	SMSG[b] 1	Grade Level 2	Sex[c] of T 3	Class Size 4	Prop Boys 5	Activ Level 6
1. Observant-facilitative	7	-.12	-.45[d]	-.30	.30	-.28	.52[d]
2. Dominative-threatening	8	-.52[d]	.48[d]	.07	-.06	.27	-.08
3. Firm-dominative	9	-.25	.21	-.10	.08	-.23	.29
4. Good-natured-personal with concern for character	10	-.12	.48[d]	.16	-.29	.21	-.10
5. Calm-acceptant-individualized	11	-.05	-.11	-.23	-.05	-.09	.49[d]
6. Businesslike-orderly	12	.21	-.38	.12	.40	-.36	-.35
7. Receptive-responsive	13	.20	.08	-.24	-.48[d]	.13	.16
8. Self-centered concern for knowledge and skill	14	-.09	-.15	.21	.24	.15	-.07
9. Warm, open with boys	15	.01	.27	.00	-.41	.33	.25
10. Formal group instruction, controlling through shame	16	-.16	.43[d]	.36	-.06	.14	-.37
11. Observant-controlling	17	.03	-.03	-.18	-.01	-.19	.30
12. Acceptant-supportive	18	-.09	.06	-.09	.03	-.27	-.10
13. Good-humored-verbose	19	.21	.43[d]	.10	-.30	-.01	-.52[d]
14. Grim domination	20	-.46[d]	.40	.19	.13	.14	-.14
15. Acceptant-controlling, avoiding negative evaluation	21	.08	-.35	-.41	-.06	.00	.54[e]
16. Cold-impersonal, emphasizing knowledge and skill	22	-.29	.20	.32	.21	.09	-.20
17. Humorless-threatening	23	-.28	.09	.32	.29	.00	-.11

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[a] Refer to Table 13, pp. 66-67, for complete descriptive phrases
[b] Score of 1 signified SMSG classroom, 0 signified non-SMSG classroom
[c] Score of 0 signified female, 1 signified male
[d] Significant at the .05 level (two tailed test)
[e] Significant at the .01 level (two tailed test)

concept and *reading*, respectively) were obtained with *grade level* held constant.

Results presented in Table 30 indicated that the fourth grade teachers were significantly more *observant-facilitative* (Component *1*), less *dominative-threatening* (Component *2*), less *good-natured-personal with concern for character* (Component *4*), less *formal instructing controlling through shame* (Component *10*), and less *good-humored-verbose* (Component *13*). Fourth grade teachers tended, also, to show less *grim domination* (Component *14*). These factors, alone, may have accounted for higher *self concepts* and greater gains made in *reading* and *mathematics* in the SMSG classrooms since four out of five SMSG teachers were assigned to that level. These findings suggested, also, that perhaps only the more secure teachers, those finding less personal need to dominate, volunteered for the experimental SMSG program - or that the SMSG selectively recruited secure teachers as a matter of policy.

No significant relationships were found regarding *sex of teacher*, although relatively high correlations approaching significance suggested that female teachers employed less *formal group instruction, controlled less through shame* (r = .36, Component *10*) and were more *acceptant-controlling, avoiding negative evaluation* (r = -.41, Component *15*).

Teachers in the larger classrooms were significantly less *receptive-responsive* (Component *7*), tended to be more *business-like-orderly* (Component *6*), and less *warm and open with boys* (Component

9). A significant positive correlation of class size with pupil problem-solving ability (.53) was pointed out earlier (Table 7). Relationships of problem-solving to components of teacher-pupil transaction (Table 31) suggested that problem-solving performance -which may be a function of class size - was partly responsible for the correlation obtained.

Table 31

Correlations of pupil problem-solving with three components of teacher-pupil transaction - businesslike demanding, receptive-responsive, and warm and open with boys

Component of transaction[a]	Var.#	Correlation with pupil Problem-solving (Var. 29)
6. Businesslike-demanding	12	.37
7. Receptive-responsive	13	-.36
9. Warm and open with boys	15	-.41

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[a] Refer to Table 13 for complete descriptive phrases

However, when the relationships of the three components (6, 7, and 9) were "partialed out" a third order partial correlate of .43 was obtained for the relationship of class size with pupil problem-solving ability, as measured by the Kaya Puzzles Test. This value (.43) failed to reach a satisfactory level of significance using a two tailed test with 18 degrees of freedom. However, it is large enough to suggest the value of further inquiry into the problem-solving characteristics of pupils in large classes in contrast to smaller ones. Since larger classes in the present sample were found to be somewhat more active ($\underline{r}$ = .24), a greater degree of peer interaction may have been in part responsible for the superior problem-solving performance observed.

Non-significant relationships, in general, were obtained for the variable - proportion of boys in the sample classrooms. It had been thought that a greater proportion of boys in some of the classes might provoke a greater degree of dominative behavior on the part of the teachers in those classrooms. No evidence of such a relationship was found. The highest correlation obtained was an $\underline{r}$ of -.36 with Component $\underline{6}$ - businesslike-orderly - which can well be explained on the basis of chance alone.

Earlier in this paper a significant negative correlation of activity level with achievement gains in mathematics was reported (Table 7, p. 39; $\underline{r}$ = -.48). It was suggested that there might have been teacher-pupil transactional factors which could have accounted for the negative relationship found. Results obtained for activity level in relation to components of teacher-pupil transactions (presented in Table 30) showed significant positive correlations with three components - observant-facilitative, calm-acceptant-individualized, and acceptant-controlling, avoiding negative evaluation - and a significant negative correlation with Component $\underline{13}$ - good-humored-verbose. Relationships of these four components with pupil gains in mathematics are given in Table 32.

Although the correlations presented in Table 32 are not large, they readily account for the relationship found between

Table 32

Correlations of pupil mathematics achievement with four components of teacher-pupil transaction - observant-facilitative, calm-acceptant-individualized, good-humored-verbose, and acceptant-controlling, avoiding negative evaluation

Component of transaction[a]	Var. #	Correlations with pupil Mathematics (Var. 27)
1. Observant-facilitative	7	.35
5. Calm-acceptant-individualized	11	-.22
13. Good-humored-verbose	19	-.23
15. Acceptant-controlling, avoiding negative evaluation	21	-.38

[a] Refer to Table 13, pp. 66-67, for complete descriptive phrases.

activity level and mathematics achievement. Thus, when the four components in Table 32 were held constant, the fourth order partial correlate fell to .03, a non-significant value. This analysis suggested that specific teacher-pupil relationships in the active classrooms, rather than the activity level of the children, per se, were responsible for the mathematics decrements.

Additional findings. A number of relationships with the target pupil variables were found which were unpredicted, and several of the components derived in this phase of the study are not closely related to the patterns of classroom teacher behavior described in the literature. An exploratory examination of the overall results obtained was made, so that some of the unexpected findings could be discussed. Table 33 presents, in composite form, all of the correlations obtained for the target pupil variables with the seventeen components of teacher-pupil transaction.

All seventeen components have been discussed in some degree in connection with one or another of the research hypotheses. However, no predictions were made regarding *differentiation of self concept*, *problem-solving*, or *synthesis*. Using a two tailed test, no significant relationships with *problem-solving* or *synthesis* were found. However, six significant correlations were obtained for *self concept differentiation*. There was an artifactual relationship between *height of self concept* and the *differentiation* score. Scores on the self concept inventory (Appendix B) ranged from a lowest possible score of 1 (on any one item) to a highest possible score of 5. Thus, if a child had a high mean score over 99 items he would necessarily have a relatively low standard deviation; in like manner, if he had a low overall mean his deviation score would be low. This artifactual relationship is reflected in the negative correlation between *SC Mn* and *SC SD* (-.59). With this artifactual relationship in mind it was possible to evaluate some of the pairings which did not show a strong relationship. Thus, Component *13* - *good-humored-verbose transactions with individuals or the class as a whole and an avoidance of small-group process* - was significantly correlated positively with *differentiation of self concept* without being closely related to *height of*

Table 33

Correlations of seventeen components of teacher-pupil transaction with eight target pupil variables

		Target pupil variables							
Component[a]	Var.#	SC Mean 24	SC SD 25	Read 26	Math 27	Flex 28	Prob Solv 29	Synth 30	Orig 31
1. Observ.-facilitative	7	48[b]	-68[d]	18	-19	11	-14	-19	16
2. Dominative-threatening	8	-71[d]	49[b]	-49[b]	-10	-20	-07	02	-16
3. Firm-dominative	9	-40	19	-27	-24	02	-03	14	18
4. Good-natured-personal	10	-25	33	-29	-19	-55[c]	-28	-10	-53[b]
5. Calm-acceptant	11	39	-34	04	-38	-11	-24	-20	-01
6. Businesslike-orderly	12	41	-13	44[b]	39	15	37	09	10
7. Receptive-responsive	13	16	-17	-05	-23	-10	-36	-10	-01
8. Self-centered with concern for knowledge	14	-18	19	-05	07	21	20	-02	11
9. Warm, open with boys	15	-16	16	-37	-38	-34	-41	-22	-30
10. Formal group instruction, using shame	16	-46[b]	61[c]	-42	-08	-49[b]	-06	05	-53[b]
11. Observant-controlling	17	32	-20	04	-20	-25	-14	-12	-16
12. Acceptant-supportive	18	09	-03	15	08	04	19	24	-12
13. Good-humored-verbose	19	-07	44[b]	10	30	-21	12	26	-09
14. Grim domination	20	-63[c]	43[b]	-34	-08	-20	06	11	-13
15. Acceptant-controlling, avoiding neg. evalua.	21	37	-48[b]	01	-29	19	-33	-26	35
16. Cold-impersonal, emphasizing knowledge	22	-52[b]	42	-21	04	-04	20	09	-11
17. Humorless-threatening	23	-37	22	-03	11	06	30	06	-10

Note: Decimals have been omitted.

[a] Refer to Table 13, pp. 66-67, for complete descriptive phrases.

[b] Significant at the .05 level (two tailed test)

[c] Significant at the .01 level (two tailed test)

[d] Significant at the .001 level (two tailed test)

self concept. Children exposed to this type of teacher behavior apparently tended to differentiate among their strengths and weaknesses and report them on an inventory, without a significant lowering of their overall mean *height of self concept*.

Since only one component (*6* - *businesslike lecture method with insistence upon attention to task and conformity to rules of procedure*) was found to have educationally desirable relationships with all of the eight target pupil variables, the question arose whether any one teacher's transactions with children had an overall positive relationship with all of the selected target variables. Inspection of Table 6 (p. 38) indicates that one teacher (T-*58*) did have an overall positive relationship (assuming a slight "halo" effect in *self concept* to be acceptable or desirable). Another teacher (T-*52*), also, had generally positive relationships. The *B* weights obtained for these two classrooms are presented in Table 34.

Table 34

Regression coefficients (*B* weights) obtained for eight target variables for two classrooms having generally positive relationships

Class	SC Mn	SC SD	Read	Math	Flex	Prob Solv	Snyth	Orig
T-52	.150	.054	.829	.404	.294	.902	-.005	.073
T-58	.534	-.097	.693	.382	.251	.455	.084	.417

Teacher *58* had accomplished almost as much with her pupils in terms of *reading* and *mathematics* achievement as Teacher *52* and enhanced the overall *self-esteem* of her children to a greater degree. Though she had less success in terms of pupil *problem-solving* performance compared to Teacher *52*, her pupils performed exceedingly well on tasks requiring originality. Reference to Table 6, p. 38, shows that pupils in her classroom enjoyed the highest level of *self-esteem* in all classrooms and were second only to Classroom *52* in *mathematics* achievement. The component scores obtained for these two classrooms representing teachers whose general overall relationships with children were associated with superior performance on all tests and higher overall *self-concepts* are given in Table 35.

A comparison of these two sets of scores shows Teacher *52* to have been somewhat more *dominative*, less *calm-acceptant*, less *receptive-responsive*, less *observant-controlling*, more *cold-impersonal, emphasizing knowledge*, and more *humorless-threatening*.

The pattern of scores obtained by Teacher *58* represents a desirable model in terms of overall educational objectives. The high level of academic achievement and creative thinking present in her classroom was accompanied by high self-esteem and a slight "halo" effect of overall competence in the school situation.

Conclusions and Implications

This study has provided solid support for the significance of the teacher-pupil relationship in the educational process. The data reported have demonstrated the wide range of transactions to be found even in a relatively small sample of classrooms in a

Table 35

Component scores for two teachers having generally positive relationships with all target pupil variables

Component of transaction[a]	Component scores[b] Teacher 52	 Teacher 58
1. Observant-facilitative-semi-private	-2.89	.00
2. Dominative-threatening	1.17	-1.52
3. Firm-dominative	-.61	-1.11
4. Good-natured-personal	-.22	-.02
5. Calm-acceptant	-1.79	1.42
6. Businesslike-orderly	.29	-1.00
7. Receptive-responsive	.52	3.20
8. Self-centered with concern for knowledge	-.34	-1.85
9. Warm, open with boys	.04	.73
10. Formal group instruction, using shame, ridicule	-.73	-1.87
11. Observant-controlling	-1.30	1.94
12. Acceptant-supportive	-.64	-.35
13. Good-humored-verbose	1.75	1.51
14. Grim domination	-1.07	-2.38
15. Acceptant-controlling, avoiding negative evaluation	-.38	.69
16. Cold-impersonal, emphasizing knowledge, skill	.31	-5.35
17. Humorless-threatening	.87	-3.32

[a] Refer to Table 13, pp. 66-67, for complete descriptive phrases.

[b] Standardized scores with mean of zero and standard deviation of one.

superior, modern suburban school system. Highly selective employment practices in this case had not resulted in homogeneity of teaching practice or classroom atmosphere. Results in this phase of the research have shown a significant relationship between the placement of a given child in one or another of the twenty-one classrooms in the sample and his subsequent self-esteem, academic achievement, and creative thinking - when compared to the performance of children placed in the other classrooms of the sample.

The method used to identify, empirically, "patterns" of teacher-pupil transactions resulted in interpretable components of classroom process which were matched with the more global behavior syndromes discussed by previous investigators. Matching with specific teacher-pupil patterns of interaction led to the following findings:

1. Height of self concept was found to be significantly related positively to one component of the "socially integrative" teacher behavior identified by Anderson (1939) - "calm, acceptant transactions in general with private, individualized instruction and a concern for divergency, attention to task, and the use of task appropriate procedures and resources."

2. The "learner-supportive" category described by Withall (1948) was found to contain some of the same components as the "socially integrative" pattern. Pupil self concepts were found to be significantly higher in classrooms

in which teachers were more "learner supportive" on the strength of the same transactional component mentioned in paragraph 1 above - "calm, acceptant transactions in general with private, individualized instruction and a concern for divergency, attention to task, and the use of task appropriate procedures and resources."

3. Predictions of superior reading and mathematics achievement in classrooms taught by "academically oriented" teachers as described by Bush (1954) were unsupported by results of this study. Reading and mathematics gains were not found to be significantly related to the transactional component most closely resembling the "academic" type of teacher.

4. Predictions of significantly higher overall self concepts in classrooms taught by teachers oriented toward counseling (as described by Bush, 1954) were not substantiated.

5. No support was given for the hypothesis that superior pupil originality and cognitive flexibility would be present in classrooms taught by "creative" teachers (as identified by Bush, 1954). On the contrary, some evidence was present that the reverse was true - that teacher-pupil transactions representing the "creative" type of teacher behavior were negatively correlated with flexibility and originality.

6. Strong support was found for positive relationships between pupil self concepts and teacher behavior characterized

by a high degree of private or semi-private communication with children, of overt facilitation of task oriented behavior, of concern for divergent responses in children, of attentiveness to pupil needs, of the use of control techniques involving humor - and a relatively low degree of negative evaluation, of domination through threat, of firmness in tone, of teacher-supportive control, of harsh "taskmaster" behavior, and of grim domination. Moderate support was given for positive relationships between these same types of teacher behaviors and pupil gains in reading. Slight support was provided with respect to cognitive flexibility and originality. Gains in mathematics were not found to be significantly related.

7. One of the two empirically derived components, which most closely represented the "harsh taskmaster" dimension of teacher behavior, was observed to be positively correlated with all the criteria used, reaching significance (with a two tailed test) in the case of reading achievement. This component - "businesslike-lecture method with insistence upon attention to task and conformity to rules of procedure" - was the only notable exception to the pattern of relations predicted (Hypothesis 7, paragraph 6 above).

8. Very little support was given to the relationships predicted with "democratic" teacher behavior. Non-significant

relationships of low order were obtained with most of the target pupil variables. In the case of one component of the "democratic" syndrome - "good-natured, personalized control with concern for sources of error, character, self-control, and proper social relations" - significant negative relationships were found with cognitive flexibility and originality.

9. The classrooms of two teachers in the sample were observed to have conditions which resulted in generally positive relationships with all the criteria of pupil growth and development employed in the study. These two teachers appeared to have differential effects related to their individual characteristics. The more dominating of the two - though a generally warm and friendly person - had a classroom in which pupils performed remarkably well in reading, mathematics, and problem-solving. The more calm, acceptant, receptive, responsive, observant, and indirectly controlling person had a classroom in which pupils enjoyed exceptionally high self-esteem and performed markedly well in reading, mathematics, problem-solving, and in tasks involving originality.

One question which continued to be unsettled throughout much of the time devoted to this research was this: "Can one teacher behave in such a manner as to have an equally beneficial effect with respect to all of the desirable dimensions of pupil growth and development?" Much of the evidence points to an answer which says "No!" There seems to be a necessity for choice. Apparently, one can value convergent skills and problem-solving ability and organize learning experience to maximize these at some cost in originality, flexibility, synthesizing ability, and self-esteem. Or one can value self-esteem and promote an integrative social system which achieves higher self-esteem but permits children to relax their efforts at maximum academic achievement. However, the fact that at least one teacher has been able to meet all criteria with positive results suggests that a certain blending of the various strands of teacher-pupil transactions may be generally beneficial - not only in terms of conventional academic knowledge and skills, but also with respect to adequate self-esteem, cognitive flexibility, synthesis, and originality.

What appears to be necessary to achieve this blending is suggested in the following summing up by White and Lippitt (1960):

> The most efficient procedure does appear to be, as a rule, democracy - if democracy is sharply differentiated from laissez-faire, with clear acceptance not only of active leadership but also of the firm use of authority when firmness is called for, and explicit delegation of authority to certain individuals when such delegation is appropriate.
>
> Of course this means that, in order to be as efficient as possible, democracy must be a highly variable thing, with continual realistic adaptation of methods to circumstances.
>
> A parent, teacher, or employer who wants to be "democratic" and also efficient should continually seek to broaden the base of participation in decision making, whenever participation is really functional and not too time consuming; yet he should usually (not always) exert active leadership and he should unhesitatingly, without the slightest feeling of guilt, use his natural authority whenever the

> situation calls for firm control or for swift, decisive, coordinated action (p. 292).

If one conceives of pupil autonomy within a program set up and continually restructured by the teacher, one can envision an elementary curriculum which operates within an "integrative" atmosphere yet which moves forward with maximum efficiency, guided always by the firm limits of the program. Such a curricular structure would permit individual creativity within the broader group effort and would encourage decision making on a level commensurate with the maturity of the pupils.

In practice such a classroom structure would probably move in cycles, as one phase of the program was superseded by another. In the beginning stages of each new phase the teacher's role would be to set limits and goals, and to structure very clearly the acceptable means by which to work to achieve goals. After a period of time, with concepts and structure understood, pupil autonomy would be increased and the teacher would transfer to individuals some of the responsibility for carrying the on-going program. In terms of thought processes the cycles might represent a trend from analytical thinking to inferential thinking, with each cycle building upon an increasingly complex inferential structure.

The results of this study are sufficiently clear in pointing out the importance of the quality of transaction that occurs between teacher and child. What seems now to be called for are several sequential analyses following the transactions of differing types of children to discover which types of teacher limit-setting and structuring are most profitable for each type of child.

Another important question concerns the long range strategy of the teacher as she moves from cycle to cycle in the process of classroom learning. This kind of problem calls for an investigation of two or three representative teachers as they transact with their children over an extended period of time.

Efficient methods of recording significant components of transaction as revealed in this study are currently being developed. In order to make longitudinal studies feasible such rapid means of encoding and recording events as they occur will be necessary.

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APPENDIX B

Instruments

Self Concept Inventory

B-8

Stanford University
LHD Project #3
11 - Spa - 61

Name________________________ Boy______ Girl______
(Check one)

School__________________ Room_____ Date___________

At certain times in the year, many people like to think about their work and how it is going. Some boys and girls have thought about the things they do and decided that the items on these pages were helpful in thinking about themselves. This is a chance for you to look at yourself and decide what your strong points are and what your weak points are. Everyone will have different answers--so be sure your answers show how you think about yourself.

Read each item and then answer the question: Compared with other boys and girls my age, how do I rate now?

Find the box which indicates your answer. The words at the top show what the boxes in each column stand for. Mark an X in one of the boxes to show your answer. Now, go right ahead. Work as fast as you like.

Excellent	Very good	Better than most	O.K.	Not so good	Compared with other boys and girls my age, how do I rate now?
☐	☐	☐	☐	☐	1. Doing well in art work, painting, or drawing
☐	☐	☐	☐	☐	2. Keeping at my work until I get it done
☐	☐	☐	☐	☐	3. Being able to read well
☐	☐	☐	☐	☐	4. Remembering what I've learned
☐	☐	☐	☐	☐	5. Being able to write stories
☐	☐	☐	☐	☐	6. Being able to laugh about things easily
☐	☐	☐	☐	☐	7. Having good grammar--being able to speak correctly
☐	☐	☐	☐	☐	8. Listening to someone even when I haven't been treated fairly or had a chance to tell my ideas
☐	☐	☐	☐	☐	9. Being able to spell correctly
☐	☐	☐	☐	☐	10. Having good handwriting even when I'm in a hurry
☐	☐	☐	☐	☐	11. Knowing how to do arithmetic--being able to solve number problems
☐	☐	☐	☐	☐	12. Enjoying outdoor activities--hiking, camping, picnics

Excellent	Very good	Better than most	O.K.	Not so good		Compared with other boys and girls my age, how do I rate now?
☐	☐	☐	☐	☐	13.	Being interested in science--learning about things scientists do
☐	☐	☐	☐	☐	14.	Being careful not to spend too much time on TV, outside activities, and play--not wasting time
☐	☐	☐	☐	☐	15.	Learning about people around the world and being interested in them
☐	☐	☐	☐	☐	16.	Being able to listen to people who don't like my ideas
☐	☐	☐	☐	☐	17.	Being able to figure out the answer that is asked for in a problem
☐	☐	☐	☐	☐	18.	Understanding how other people feel when they have troubles or problems
☐	☐	☐	☐	☐	19.	Having athletic skills
☐	☐	☐	☐	☐	20.	Making letters and numbers clearly and easily
☐	☐	☐	☐	☐	21.	Being interested in music--singing or playing an instrument
☐	☐	☐	☐	☐	22.	Having fun with girls in the class
☐	☐	☐	☐	☐	23.	Learning words in some other language--like Spanish, French, or German
☐	☐	☐	☐	☐	24.	Spending most of my time on my work, not fooling around
☐	☐	☐	☐	☐	25.	Seeing small but important facts in solving hard problems
☐	☐	☐	☐	☐	26.	Being able to talk about my ideas in a group
☐	☐	☐	☐	☐	27.	Being a good sport
☐	☐	☐	☐	☐	28.	Making friends easily with boys
☐	☐	☐	☐	☐	29.	Being able to see things in my mind easily when I want to
☐	☐	☐	☐	☐	30.	Not minding if others disagree with my ideas

Excellent	Very good	Better than most	O.K.	Not so good		Compared with other boys and girls my age, how do I rate now?
☐	☐	☐	☐	☐	31.	Having a friendly smile ready for everyone
☐	☐	☐	☐	☐	32.	Being the right size--not too tall, not too short
☐	☐	☐	☐	☐	33.	Using old facts in many different ways
☐	☐	☐	☐	☐	34.	Being able to set my own goals and work toward them
☐	☐	☐	☐	☐	35.	Working with others to get a job done
☐	☐	☐	☐	☐	36.	Being able to talk to teachers easily--feeling comfortable with teachers
☐	☐	☐	☐	☐	37.	Thinking up answers to problems--answers no one else has thought of
☐	☐	☐	☐	☐	38.	Letting others do their jobs in their own ways--not bossing people around
☐	☐	☐	☐	☐	39.	Being a good athlete--doing well in sports
☐	☐	☐	☐	☐	40.	Seeing new ways of thinking about things and putting ideas together
☐	☐	☐	☐	☐	41.	Enjoying funny things people do or say
☐	☐	☐	☐	☐	42.	Controlling my temper with boys
☐	☐	☐	☐	☐	43.	Enjoying games and sports
☐	☐	☐	☐	☐	44.	Being able to finish one job before I start another
☐	☐	☐	☐	☐	45.	Being able to figure out the key to a hard problem
☐	☐	☐	☐	☐	46.	Being honest about my feelings
☐	☐	☐	☐	☐	47.	Knowing what it's like to have your feelings hurt--and that others feel the same way
☐	☐	☐	☐	☐	48.	Making friends easily with girls
☐	☐	☐	☐	☐	49.	Going ahead with school work on my own--not waiting to be told to get started
☐	☐	☐	☐	☐	50.	Having ideas come easily and quickly

Excellent	Very good	Better than most	O.K.	Not so good		Compared with other boys and girls my age, how do I rate now?
☐	☐	☐	☐	☐	51.	Being able to tell my ideas in front of other people
☐	☐	☐	☐	☐	52.	Taking my turn--not cutting in line in front of someone else
☐	☐	☐	☐	☐	53.	Having plenty of friends among the boys
☐	☐	☐	☐	☐	54.	Being able to keep my mind on my work
☐	☐	☐	☐	☐	55.	Being interested in new things, excited about all there is to learn
☐	☐	☐	☐	☐	56.	Being willing to tell my ideas even when no one else agrees with me
☐	☐	☐	☐	☐	57.	Liking something in everyone no matter who he is
☐	☐	☐	☐	☐	58.	Being attractive, good-looking--or handsome
☐	☐	☐	☐	☐	59.	Being well organized, having materials ready when they're needed
☐	☐	☐	☐	☐	60.	Being able to remember things that I've been taught
☐	☐	☐	☐	☐	61.	Being able to enjoy jokes--having a good sense of humor
☐	☐	☐	☐	☐	62.	Helping in committee work when it's my turn
☐	☐	☐	☐	☐	63.	Being cooperative with teachers
☐	☐	☐	☐	☐	64.	Getting my school work in on time, not getting behind
☐	☐	☐	☐	☐	65.	Knowing what to do to get the right answer to a problem
☐	☐	☐	☐	☐	66.	Having high standards for myself--knowing the kind of person I want to be
☐	☐	☐	☐	☐	67.	Not minding others who have different ideas of right and wrong
☐	☐	☐	☐	☐	68.	Having nice clothes--the right kind for my age
☐	☐	☐	☐	☐	69.	Seeing important facts that other people miss

Excellent	Very good	Better than most	O.K.	Not so good		Compared with other boys and girls my age, how do I rate now?
☐	☐	☐	☐	☐	70.	Not expecting everything I do to be perfect
☐	☐	☐	☐	☐	71.	Being able to pay attention even when I'm angry
☐	☐	☐	☐	☐	72.	Enjoying after school games and activities
☐	☐	☐	☐	☐	73.	Letting my imagination go when I want to
☐	☐	☐	☐	☐	74.	Making up my own mind, even if other people disagree with me
☐	☐	☐	☐	☐	75.	Understanding other people's feelings
☐	☐	☐	☐	☐	76.	Having nice skin
☐	☐	☐	☐	☐	77.	Changing my point of view to get new ideas
☐	☐	☐	☐	☐	78.	Being able to make people laugh--being comical or humorous
☐	☐	☐	☐	☐	79.	Being fair to other people even when I don't like them especially
☐	☐	☐	☐	☐	80.	Having fun at school with teachers
☐	☐	☐	☐	☐	81.	Thinking of unusual things--things other people don't think about very much
☐	☐	☐	☐	☐	82.	Being able to admit my mistakes
☐	☐	☐	☐	☐	83.	Liking everybody at least a little bit
☐	☐	☐	☐	☐	84.	Being able to find new ways of fitting ideas together
☐	☐	☐	☐	☐	85.	Being able to lead my life in my own way
☐	☐	☐	☐	☐	86.	Doing my part in classroom activities--including work jobs and clean-up
☐	☐	☐	☐	☐	87.	Being able to solve a hard problem by turning it around and seeing it in a new way
☐	☐	☐	☐	☐	88.	Being able to listen to someone even when I think what he is saying is all wrong
☐	☐	☐	☐	☐	89.	Being able to think quickly and easily

Excellent	Very good	Better than most	O.K.	Not so good		Compared with other boys and girls my age, how do I rate now?
☐	☐	☐	☐	☐	90.	Understanding my feelings and being able to control myself
☐	☐	☐	☐	☐	91.	Learning about new things even when other people aren't interested--studying about things on my own
☐	☐	☐	☐	☐	92.	Knowing how others feel when they have hard problems to solve
☐	☐	☐	☐	☐	93.	Solving problems in ways others haven't tried before
☐	☐	☐	☐	☐	94.	Being able to lose in a game and not complain about it
☐	☐	☐	☐	☐	95.	Being friendly to everyone
☐	☐	☐	☐	☐	96.	Taking part in class projects--doing my share
☐	☐	☐	☐	☐	97.	Having new, original ideas
☐	☐	☐	☐	☐	98.	Knowing that everyone is different and has a right to be
☐	☐	☐	☐	☐	99.	Controlling my temper with girls

Listed below are several school subjects. Think about which of these subjects are most important for boys to be able to do. Then mark with numbers (from 1 to 5) to show how you rank the five most important subjects for boys. Mark on the lines on the left side under the words "FOR BOYS." Put a "1" to show the subject that is most important, put a "2" to show the next most important subject for boys--and so on until you have marked five subjects.

Then think about girls and the most important subjects for girls. Mark the most important subject for girls with a "1" on the line to the right. Then mark the next most important subject for girls with a "2"--and so on.

FOR BOYS		FOR GIRLS
______	Music--playing an instrument, or being able to sing well	______
______	Reading--being able to read well	______
______	Handwriting--having good handwriting	______
______	Science--being interested in science, knowing about science	______
______	Arithmetic--knowing how to do problems using numbers	______
______	P. E.--doing well in sports and games	______
______	Social studies--knowing about people around the world	______
______	Foreign language--learning to speak another language	______
______	English--being able to write and speak correctly .	______
______	Art--being able to draw and paint well	______

SELF-CONCEPT INVENTORY

CLASSIFICATION OF ITEMS ACCORDING TO THEORETICAL DIMENSIONS

Physical Ability and Activity - Athletics

Physical skill

19. Having athletic skills
39. Being a good athlete--doing well in sports

Enjoyment of sports, outdoors, etc.

12. Enjoying outdoor activities--hiking, camping, picnics
43. Enjoying games and sports
72. Enjoying after school games and activities

Social Relations with Boys and Girls

Girls

22. Having fun with girls in the class
48. Making friends easily with girls

Boys

28. Making friends easily with boys
53. Having plenty of friends among the boys

Attractive Appearance

32. Being the right size--not too tall, not too short
58. Being attractive, good-looking--or handsome
68. Having nice clothes--the right kind for my age
76. Having nice skin

Social Relations with Teachers

36. Being able to talk to teachers easily--feeling comfortable with teachers
63. Being cooperative with teachers
80. Having fun at school with teachers

Work Habits

Persistence - perseveration

2. Keeping at my work until I get it done
44. Being able to finish one job before I start another

Organization - planning

14. Being careful not to spend too much time on TV, outside activities, and play--not wasting time
49. Going ahead with school work on my own--not waiting to be told to get started
59. Being well organized, having materials ready when they're needed
64. Getting my school work in on time, not getting behind

Concentration - application

24. Spending most of my time on my work, not fooling around
54. Being able to keep my mind on my work

Mental Abilities (including creativity)

Memory

4. Remembering what I've learned
60. Being able to remember things that I've been taught

Convergence

17. Being able to figure out the answer that is asked for in a problem
65. Knowing what to do to get the right answer to a problem

Sensitivity - alertness - awareness

25. Seeing small but important facts in solving hard problems
69. Seeing important facts that other people miss

Imagination - fantasy production

29. Being able to see things in my mind easily when I want to
73. Letting my imagination go when I want to

Flexibility

33. Using old facts in many different ways
77. Changing my point of view to get new ideas

Divergence - originality

37. Thinking up answers to problems--answers no one else has thought of
81. Thinking of unusual things--things other people don't think about very much
93. Solving problems in ways others haven't tried before
97. Having new, original ideas

Integration - synthesis

40. Seeing new ways of thinking about things and putting ideas together
84. Being able to find new ways of fitting ideas together

Penetration - analysis - circumspection

45. Being able to figure out the key to a hard problem
87. Being able to solve a hard problem by turning it around and seeing it in a new way

Fluency

50. Having ideas come easily and quickly
89. Being able to think quickly and easily

Interest - curiosity

55. Being interested in new things, excited about all there is to learn
91. Learning about new things even when other people aren't interested--studying about things on my own

Mental Attitudes

Humor - playfulness

6. Being able to laugh about things easily
41. Enjoying funny things people do or say
61. Being able to enjoy jokes--having a good sense of humor
78. Being able to make people laugh--being comical or humorous

Emotional self-acceptance - integrity

16. Being able to listen to people who don't like my ideas
46. Being honest about my feelings
70. Not expecting everything I do to be perfect
82. Being able to admit my mistakes

Dominance - assertion - ascendance

26. Being able to talk about my ideas in a group
51. Being able to tell my ideas in front of other people

Self-confidence - independence - autonomy

30. Not minding if others disagree with my ideas
56. Being willing to tell my ideas even when no one else agrees with me
74. Making up my own mind, even if other people disagree with me
85. Being able to lead my life in my own way

Personal aspiration - standards

34. Being able to set my own goals and work toward them
66. Having high standards for myself--knowing the kind of person I want to be

Human Relations Skills

Emotional control

8. Listening to someone even when I haven't been treated fairly or had a chance to tell my ideas
42. Controlling my temper with boys
71. Being able to pay attention even when I'm angry
90. Understanding my feelings and being able to control myself
99. Controlling my temper with girls

Empathy - understanding

18. Understanding how other people feel when they have troubles or problems
47. Knowing what it's like to have your feelings hurt--and that others feel the same way
75. Understanding other people's feeling
92. Knowing how others feel when they have hard problems to solve

Fairness - good sportsmanship

27. Being a good sport
52. Taking my turn--not cutting in line in front of someone else
79. Being fair to other people even when I don't like them especially
94. Being able to lose in a game and not complain about it

Warmth - friendliness

31. Having a friendly smile ready for everyone
57. Liking something in everyone, no matter who he is
83. Liking everybody at least a little bit
95. Being friendly to everyone

Cooperation - participation

35. Working with others to get a job done
62. Helping in committee work when it's my turn
86. Doing my part in classroom activities--including work jobs and clean-up
96. Taking part in class projects--doing my share

Acceptance - tolerance

38. Letting others do their jobs in their own ways--not bossing people around
67. Not minding others who have different ideas of right and wrong
88. Being able to listen to someone even when I think what he is saying is all wrong
98. Knowing that everyone is different and has a right to be

School Subjects

1. Doing well in art work, painting, or drawing
3. Being able to read well
5. Being able to write stories
7. Having good grammar--being able to speak correctly
9. Being able to spell correctly
11. Knowing how to do arithmetic--being able to solve number problems
13. Being interested in science--learning about things scientists do
15. Learning about people around the world and being interested in them
21. Being interested in music--singing or playing an instrument
23. Learning words in some other language--like Spanish, French, or German

Handwriting skills

10. Having good handwriting even when I'm in a hurry
20. Making letters and numbers clearly and easily

Revised by R. Spaulding
February, 1961

School of Education
New York University

EXPERIMENTAL TEACHING CENTER

SOLVING PUZZLES

Form X

TEACHER'S MANUAL OF INSTRUCTIONS

First Edition
September 1, 1960

GENERAL INSTRUCTIONS TO THE TEACHER

This is a test of children's thinking. Each part of the test measures a different sort of thinking ability.

While the teacher should see that the pupils answer the questions carefully, it is extremely important to avoid giving any suggestions on how to answer a question beyond explaining the instructions given. If the teacher offers any suggestions, this will influence how the pupil answers, and the test will no longer measure his ability to think. Pupils must not ask questions about their answers, such as how to spell a word, since this may suggest answers to other children. Naturally, pupils must not look at each other's answers.

The puzzle solving quality of the test may make the pupils want to discuss their answers after the test is over. Nothing can be done to prevent pupils from making informal comparisons of their answers. But the teacher must avoid taking part in any such discussion, either with the class as a whole or with individual pupils.

A time limit is specified for each part of the test. These times should be followed accurately. The teacher should provide herself with a watch with a second hand to time the test accurately.

This test is intended for grades 3 to 6. Pupils in the third grade may find many of the questions too hard for them. To minimize frustration as a result of this, the instructions tell the pupils they are not expected to finish but are to do the best they can.

In giving the test, the teacher will read the following instructions to the pupils. (All statements in parentheses are for the teacher's use.)

INSTRUCTIONS FOR ADMINISTERING THE SOLVING PUZZLES TEST--FORM X

(Have the pupils clear their desks and see that they have sharpened pencils. Distribute test booklets, telling pupils not to open them until told to do so.)

In this test you will solve some puzzles. You will have a short time to solve each of the puzzles. Work quickly and use all the time you have. In many of the puzzles, the more you think the better you will do. No one in the class is going to be able to finish all the puzzles. Just do the best you can.

We will do the test one part at a time. When you come to a new part, always wait for me to go over the example with you before you start working on that part.

When you are working on the test, you are not allowed to ask any questions of me or of your friends. When you think of something you can not spell, write it down the best way you can. If you don't understand my explanation, just say, "I don't understand," and I will repeat the directions. Remember, you must not ask any questions about answering anything.

Now, on the cover of the test, write your name on the line where it says "Your name." Now write (teacher supplies grade number) on the line where it says "Grade." You may put your birth date on the line where it says "Your age." (Note: If children do not know their birth dates, the teacher is requested to supply the date from her records.) And put a check mark (write ✓ on the board) like this on the line next to boy if you are a boy, next to girl if you are a girl.

Now turn the page to the start of the test.

(PART 1)

Part 1 says, "Each word below has some smaller words hidden in it." Put down as many of the hidden words as you can find without changing the place of any letters around or leaving any spaces between letters. In the example word "wallet" you can find wall, a, all, let. These hidden words are all right. But you cannot have wet, or eat, because you would be changing the places of the letters around.

Now do the questions. You will have 5 minutes. Stop when you finish all you can do on questions one to six.

(After 5 minutes) Stop working on Part 1.

(PART 2)

Look at Part 2. It says you are to name as many things as you can think of for each question. The example says to name all the things you can think of that hurt. Some of these things are: slapping, needle, falling, fire, bruises, knife.

Now answer questions 7 through 11. You have ten minutes, so use your time wisely. Look at the next page to see where you will stop. You will do questions 7 through 11. Keep working on these questions until the time is up.

(After 10 minutes) Stop working on Part 2 and turn the page.

(PART 3)

In Part 3 you have four things to write about. Each of these things can be used in different ways. Write down all the ways you could use these things. The example word is string. The answer says what string can be used for. A piece of string can be used to tie packages, to pull shades, to make a pulley, to jump rope with, to hang clothes on, to attach tickets, to play yo-yo, to make a sling, and other things, too.

Now think of all the ways you could use each of the four things below and write them down. You have eight minutes. Stop at the bottom of the page. If you have more time, go back to try to do some more on the questions on this page.

(After 8 minutes) Stop working on Part 3 and turn the page.

(PART 4)

Look at Part 4. It is about words that have more than one meaning. There are two words in each question. These two words do not mean the same. But in every question there is a third word which can mean the same as the first word, and it can mean the same as the second word. Find this third word and write it down in the empty place between the two words.

Look at the example. You have stone and a space--then swing.* Stone does not mean swing. But rock means stone if you think of one meaning of rock. And it means swing if you think of a second meaning of rock, the way it is used in "rocking chair." Because rock is the answer, it is written in the empty place between the two words.

Now you answer the questions in Part 4 and write your answers in the empty place between the two words. You have 8 minutes.

(After 8 minutes) Stop working on Part 4 and turn the page.

(PART 5)

In Part 5 you have three questions. Each question has four words. You are to tell a very short story with two or three sentences using all four words. The example gives you the words armchair, ranch, watch, and cards. I can say: "The man in the armchair looked at his watch and decided to get back to the ranch. He put the cards in the drawer, cleaned up his desk, and soon left the office." All four of the words are used in this little story. Now you make up your own story for each of the three questions. You may use the words in any order you like and as many times as you like. You have 12 minutes.

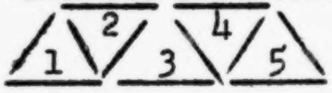
---

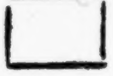
*stone (   ) swing

(After 12 minutes) Stop working on Part 5 and turn the page.

(PART 6)

In Part 6 you have five puzzles using match sticks. Each small line in a drawing is one match stick. (Draw the example on the board. Begin with the left triangle and follow the numerical order given here.



While you draw say, "Here is one triangle made of three matches, here's another, here's another, and another, and another.") In each puzzle, you will take away some match sticks which will solve the puzzle. You must put a circle through the match sticks which you think should be taken away. Look at the answer to the example on your paper. The example says to take away two matches and leave three triangles. See the two matches with circles drawn through them? When these matches are taken away, you have three triangles left, like this. (Draw circles in the example on the board, and point out the three triangles that are left.) Each question will ask you about triangles or boxes. This is a box . This is a triangle .

In each question you have two drawings that are alike. Use the first drawing to practice on. When you find the answer, put your circles on the other drawing to the right where it says "Your answer." Go ahead and answer the questions. You have 10 minutes.

(After 10 minutes) Stop working on part 6 and turn the page.

(PART 7)

In Part 7, each question has a row of words lined up according to some rule. For each question, you are to find the rule and write it down. Look at the example: mouse, cat, pig, cow, elephant. Cat is bigger than mouse, pig is bigger than cat, cow is bigger than pig, and elephant is bigger than cow. What is happening is that the animals are getting bigger. So, in the answer, the rule is: "The animals get bigger."

Now you find the rule in each of the questions, and write it down. You have 5 minutes.

(After 5 minutes) Stop working on Part 7 and turn the page.

(PART 8)

In Part 8, each question has a drawing. You are to write down all the things you think each drawing could be. Look at the example. This could be the rising sun, a porcupine, eye-lashes, a brush, a carnation, a rainbow, and maybe other things.

Now look at the other drawings and write down all the things you can see in each drawing. You have 7 minutes. Keep working on this page until I tell you to stop working. Do as many as you can.

(After 7 minutes) Stop working. Put your pencils down. That is the end of the test. Don't worry if you haven't finished some of the things. No one was expected to finish it all.

(COLLECTING PAPERS)

Look at the cover of the test to make sure you wrote your name on it. Now pass your test booklets in.

FINAL INSTRUCTIONS TO THE TEACHER:

When all the papers are collected, immediately put them in an envelope, seal the envelope, and deliver it to the principal's office.

SCORING MANUAL

CREATIVE THINKING MEASURES

SOLVING PUZZLES - FORM X*

Revised

by

R. L. Spaulding

May, 1961

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*This test was developed by Dr. Esin Kaya, Head, Experimental Teaching Center, School of Education, New York University, New York. The writer is indebted to Dr. Kaya for permission to reproduce the instrument for use in this research.

GENERAL INSTRUCTIONS:

Compute scores separately for each part.

Factor Scores: (combine part scores for these factor scores)

Flexibility: Add parts 1 and 3
Problem Solving: Add parts 1, 6, and 7
Organization: Add parts 4 and 5A
Originality: Add parts 2, 3, 8 and 5B

Total Factor Score: Add four Factor Scores.

PART 1

Score one point for each correct response.

Item 1: heat, eat, at, he, a. 5
Item 2: star, tar, tart, art, st., a. abbrev. for *street* 6
Item 3: plan, lane, plane, an, net, la, a. 7
Item 4: teach, tea, each, ache, he, her, a, cher. 8
Item 5: tone, ton, on, one, to, o, st. 7
Item 6: flow, low, lower, owe, ower, ow, we, lo, o. 9

The total possible score for *Part 1* is *42*.

PART 2

Score one point for each relevant response *not* on these lists.

Note: Use your judgment to decide if response is essentially the same as one of these, e.g. "mouse" is essentially the same as "mice." In general, give credit for *elaboration* of common responses, not for restatements or provincialisms.

Item 7: Note: Must be round in all dimensions involved to get credit.

Dish
Button
Ring
Ball
Clock, watch
Globe, world, earth
Sun
Moon
Planets
Circle, "O"
Apple, orange, peach, apricot, grapefruit
Eyes
Head, face
Wheel, tire
Hoop
Knob
Balloon
Nickel (max. credit 1 for any or all U. S. coins; one point for each additional nationality)

Item 8: Note: No credit if noise is not a part of the usual function of the object. Objects with moving parts need only be mentioned.

Radio
TV
Car, truck
Horn
Dog
Cat
Baby
Gun
Children, boys, girls
People
Bird
Train
Plane, airplane, jets
Bikes
Bell
Mouse or mice, rats
Horse
Drum
Cow
Crying
Door
Stamping feet
Clock, watch

Item 9: Note: No credit for anything which would usually happen if you were not left alone in a super market, e.g. would buy food; would push cart.

Would be lost (be scared)
Would go home
Would look for mother
Would tell the man in the store
Would cry (mostly younger children)
Would go to the police (or call the police)
Would call for help from the window
Would eat the food
Would look around the store
Would run (or go) out of the store
There would be no people to buy from
You could take anything you wanted
You could eat the food there
You wouldn't be hungry

Item 10:

We wouldn't have chickens, eggs, milk
We wouldn't have any fur
It would be very quiet
It would be a dull place to live, wouldn't have any fun
I couldn't have a dog (cat, etc.).
There would be no farms
There would be no horses
We could only eat vegetables, no meat, not much food
There would be no people
There would only be plants
There would be no pets

Item 11:

They would bump into you
No one would play with you (or talk with you)
You'd have no friends
No one would know you
You would be lonely, sad, unhappy
You would be invisible
You would shout or call out
You could get hurt (run over), hit
There would be no food to eat
You could fool people
You wouldn't have to go to school
People would think you're a ghost
No one would take care of you if you were sick
I'd do anything I wanted to
You could steal things
You could go places free

PART 3

Score one point for each relevant response not on these lists.

Note: Give no credit for restatement--but give credit for any elaboration of common responses.

Item 12:

To read
To wrap
To start or build a fire, to burn
To look at
To learn things, (for the news) (different kinds of news, e.g. sports, world, movies, weather, etc.), to know the world
To cut out things
To tear
To make things, paper hats, papier-maché, planes
To fold
To cover things when you paint
To put on the floor to keep it clean
To paint on
To get an apartment
To sell
To hit flies (or dogs) with

Item 13:

To cut things (string, bread, food, meat, apple, tomatoes, etc.), to use as a tool
To kill with (to kill or hurt people, animals, etc.), to use as a weapon, to stab
To carve (wood), to cut a hole, to carve soap
To crack nuts
To peel (fruits, onions)
To slice
To eat with
To spread butter
To sharpen
To whittle
To throw (play games with)

Item 14:

Wheel for a car, bike, truck, train, cart, motorcycle, wheelbarrow, tractor, trailer, or wheel for any vehicle
To change flats
To ride or roll on
To swim with, as a life-saver, as a float or raft
To swing on
To stand on, bounce on, jump on or over
To play with
(When interpreted as to be tired)--to retire, to rest

Item 15:

To plug up holes, to stop up things
To float, to make floats, on boats, for life-savers
For bottles
To carve
For shoes
To burn
To play with
To experiment with (use in science)

PART 4

Score each correct response with a score of 3. (Total possible 21 points.) The correct responses are given below.

Item 16: Train, tooter

Item 17: Picture or cartoon

Item 18: Present

Item 19: Bow

Item 20: Ship

Item 21: Light

Item 22: Store

Item 23: (Note: This item has been left out of the scoring because of lack of validity.)

PART 5 SCORE TWICE

5A: Score in red pencil according to the following standards:

Note: Plurals, -ing, -ed, etc. are OK. Relating doesn't mean listing.

	Type of Response	Score
1.	No sentence	0
2.	Less than 4 words used without any relation to each other, e.g. "I have a job. I play in sand."	1
3.	All 4 words used without relation to each other, e.g. "I have a job. I play in sand. The sky is blue. People are funny."	2
4.	Less than 4 words used in relation to each other in part or on the whole, e.g. "People have jobs. Mine is to play in the sand." Or, "I watch the sky and the sand. I have a good job."	3
5.	Using all 4 words, relating some but not all of them, e.g. "People have a job digging sand. The sky is blue."	4
6.	Using all 4 words and relating them all to each other, e.g. "People have a job digging sand. It is fun if the sky is blue but very difficult when it rains."	5

5B: After all tests have been completed (N = approx. 600), these stories will be sorted for originality. Scored in black.

Originality in Part V is determined quite subjectively, since even when the content of two stories is quite similar, a word or two may change the quality of the response. Consider the two responses below:

> "I have a job in the sky. It is to throw sand on people."
> "My job is to fly in the sky and throw sand on people who are caught in the fire."

The second story, even though quite similar to the first in content, would often be scored as a more original story. Often the determining factor of what makes a story original is the amount of imagination it reflects, not only in the idea itself, but also in the way the idea is presented.

This is the only part in the test where originality is not interpreted solely as the infrequency of responses. In this part the imaginative qualities of the content and of the way the content is expressed are even more important than the infrequency of a response. To receive a score in originality, then, a response must both (1) be infrequent, or unusual and (2) reflect imagination in content and in expression.

Scoring Criteria:

Weight 1. a) the old story--I've heard it before--no wrinkle
b) incomprehensible
c) just listing of words--no elaboration

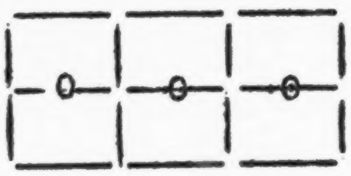
3. a) the old story with a new wrinkle
   b) mediocre structure but some original comment, expression, idiom, or twist

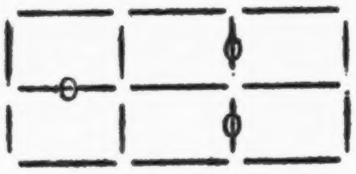
5. a) rarity! a gem!
   b) good or excellent expression!
   c) story has a plot and an ending (may be bizarre)

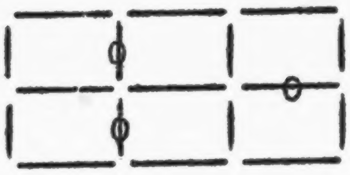
PART 6

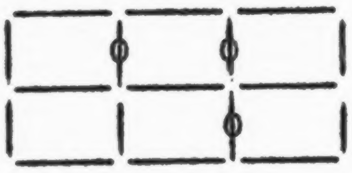
In this part an item may have more than one correct response. All of the correct responses are given below. If any of these responses are given to an item, the score of the item will be 5 points.

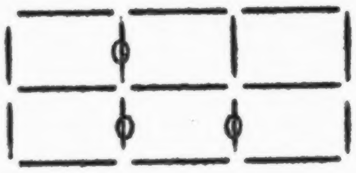
Item 27:

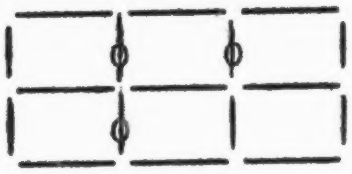


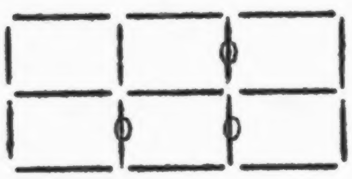


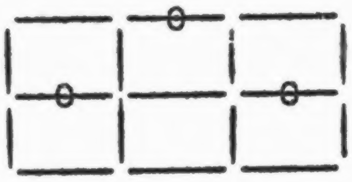


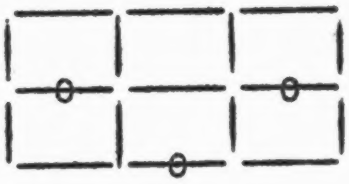


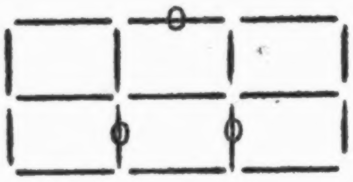


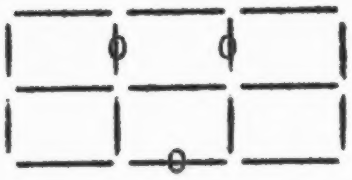












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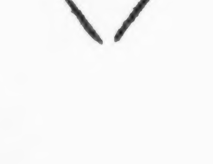
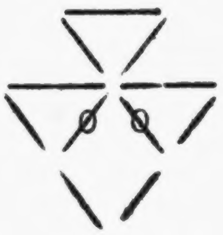
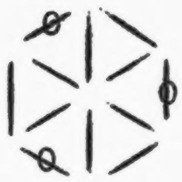
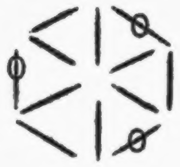


Item 29:

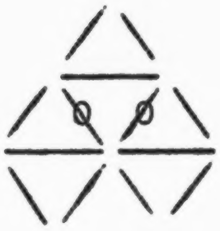


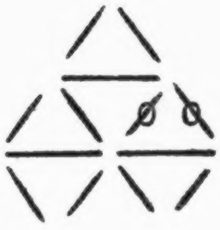
Item 30:

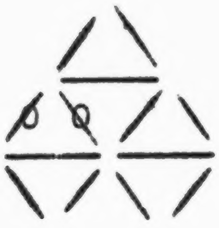


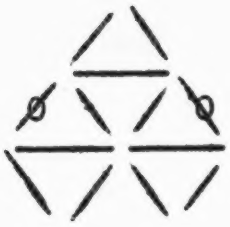


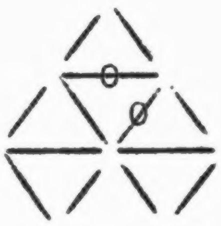
Item 31:

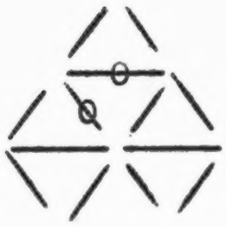












PART 7

As in Part 6, scores in Part 7 are weighted so that a correct response to an item receives the score of 5. The correct responses to the items are given below. It should be remembered, however, that the given responses are not all exclusive, and a scorer should watch for other possible responses which may be logically correct.

Incorrect responses

(a) Reversing the trend. A common incorrect response is given to Item 32: "The fruits are getting bigger (or larger)."

It is given here as an example because the scorers have shown a tendency to score a reversed response as correct. The response should be considered wrong unless it represents the trend as it is given from left to right.

(b) Classificatory responses. They are all "fruits" or they are all meals, etc. These responses do not indicate a trend.

(c) Repeating the question. The response, "They are in order," for example, does not indicate the rule according to which the given words are in order. Logically, it simply repeats the given information.

Correct responses   Note: 5 points each correct response

Item 32:

The fruits are getting smaller or less juicy.
The words are getting shorter.

Item 33:

Getting more active, livelier.
Getting more energetic.
Getting faster.
Baby growing up.
They are in order from least active to most active.
Getting stronger and recovering from illness are both acceptable answers.

Item 34:

Getting later in the day.
We eat each one after the other.
They are in the order we eat them.
The meals are in time order.
Going from morning to evening.
Alphabetical order.

Item 35:

Getting lighter.
Getting softer.
Getting weaker.
They are in order from hard to soft.
Getting more flexible.

Item 36:

Getting more real.
Getting more life-like, or alive.
Getting more tangible is an acceptable response even though it is not strictly correct.

Item 37:

The number of dimensions decrease.
There is one measure less each time.
One measure less is needed each time.
Alphabetical order.
Dimensions get smaller or less complex are acceptable answers.
Measures get less complex is also an acceptable item.

PART 8

Score one point for each relevant response not on these lists.

Note: Record on a separate sheet any high frequency response appearing on tests and not on lists. We may later add them to the lists and rescore.

Note: Any elaboration of the following common responses gets credit.

Unacceptable responses

Item 38:

Lolly-pop
Tree
Flower
Candle
Clock
Wand
Brush
Ice-cream pop
Candied apple
Pin-wheel
Stick with five dots
Design, drawing

Item 39:

Rain, raindrops, rain falling
Snow, snowflakes, snow falling
Bombs falling, bullets from a gun
Soldiers (marching, or parade, toy soldiers)
Drawing (design) with five lines, design
Lines
Sticks, toothpicks, poles, matchstick, matches
Needles and pins
Planes
Eye-lashes
Plants, (flowers, trees, stems, grass, weeds)

Item 40:

Hat, cap, snow cap
Ice-cream (cake) with cherry
Part of a head
Fat man (woman) with a small head, doll
Design, drawing
Upside-down bowl
Hill (mountain)
Person (or head) with long arms
A walrus (mustache)
Rainbow
Half of the sun (moon, earth) also the earth and the moon or the sun and the earth, planet, etc.
Cover of a pot, bowl, dish, pan, lid

Item 41:

Electric oven, stove, range
TV or radio (with knobs, dials, etc.)
Instrumental panel of car (dashboard), plane, truck, jet
Something on a table
Box (with something on it, or in it, or with holes)
Toothbrush
Cake (with cherries, birthday cake)
People on a couch or sofa
Sink
Design, drawing

Item 42:

Lines (on paper, in notebook, on flag)
Wood boards
Sticks
Street, sidewalk, road, highway
Tracks (railroad tracks, race track)
Drawing, design
Hour-glass, egg-timer, sand-timer
Subtraction sign, division sign
Box or envelope with a slot, a bank

R. L. Spaulding
Revised 5/62

Teacher-pupil Transactions[1]
University of Illinois

Manual for the

TRANSACTION SAMPLE: CLASSROOM[2]
(TSC)

Introduction

The TRANSACTION SAMPLE: CLASSROOM observation and tape analysis schedule (TSC) is an instrument devised to classify teacher behavior in the elementary school setting. It is intended primarily for classroom teacher-child transaction analysis but may also be extended for use outside the classroom.

The present schedule constitutes a modification of an earlier form entitled the INTERACTION SAMPLE: TEACHER (IS-T) devised by Dr. Richard Alpert and Margaret Pintler of the staff of the Laboratory of Human Development, Stanford University. The present modifications have been made to extend the categories of analysis to include additional dimensions of transaction, such as the expression of authority and the publicity of communication, as well as to facilitate its use with magnetic tape recording equipment. The author is also indebted to Gerald Davison of Harvard University for suggestions and ideas in the development of this manual.

The TSC has been designed to sample teacher behavior in the classroom at specified intervals of time. In collecting data, time sampling intervals varying in length from 10 or 15 seconds to 90 seconds, or so, may be used. These intervals are indicated by superimposing a signal on the tape by tapping an auxiliary microphone with a pencil eraser as the second hand of the observer's watch eclipses a pre-determined time interval. At the moment of tapping the observer notes the behavior of the teacher and scores it on his recording sheet.

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[1] This research is supported by funds from the U. S. Office of Education, Cooperative Research Branch (Project #1352).

[2] This manual constitutes a preliminary draft of a portion of a report to be issued later by the U. S. Office of Education, Cooperative Research Branch. It is not to be duplicated or reproduced in any way without permission of the author.

The audible behavior of the teacher is picked up by a combined transistorized microphone and transmitting unit which the teacher wears about his neck. This small, eight ounce microphone-transmitter has been found to be soon forgotten by the majority of the teachers who have participated in research of this type and it did not interfere with their normal movement.

The observer notes the ongoing activity in the classroom during the entire sampling interval and scores the momentary behavior of the teacher with the past events in mind. Facial expressions and other non-verbal communicative behavior are observed and recorded when they occur at the time signal. Notes are made of blackboard scriptions, as well as the nature of the subject matter assigned to the children.

As soon as the observer completes the scoring of the momentary teacher behavior he observes and records the activity level of the children. In general, this measure is taken approximately five seconds before the next signal.

The observer first scores the "molar" teacher behavior - that is, whether the teacher is manifestly approving, disapproving, instructing, listening, communicating with an adult, engaged in personal activity, absent from the room, or observing the children at work. If communicating in some way with a child or the class the observer records the direction of communication. The publicity of communication is also noted. If the teacher is observed to be listening to someone a further coding is done on the basis of attention given to the speaker. Listening with divided attention was differentiated from listening with full attention given to the speaker.

A copy of the OBSERVER'S TSC SCHEDULE follows.

OBSERVER'S TSC SCHEDULE

ACTIVITY LEVEL

0 - all children seated
1 - one child standing, walking or moving about
2 - two children standing, walking, or moving about
3 - three or more children standing, walking, or moving about

MOLAR T

Check all units of 1, 2, 3
Comment on all non-verbal units of 1, 2, 3

1 - Approving
2 - Disapproving
3 - Instructing-Managing-Structuring (also non-verbal demonstration)

Code all other behavior as follows:

41 - listening attentively, with undivided attention
42 - listening with divided attention; eyes on someone else

5 - communicating with adults, or child from another classroom (with no overt affect on children)
6 - personal activity, paper work, reading, passing out papers or collecting them
7 - absent from room
8 - surveying room, moving about in a non-punitive way; making notes regarding classroom
0 - unclassifiable

DIRECTION (score only with Molar T categories 1 through 4)

1 - class as a whole
2 - sub-group (formal or designated sub-group)
3 - boy
4 - girl
0 - unclassifiable

PUBLICITY (score only with Molar T categories 1 through 4)

1 - all or most can and do hear; if non-verbal - all or most do take notice
2 - a few nearby can hear; if non-verbal - a few do take notice
3 - no one else hears; if non-verbal - no one else takes notice

Note: Non-verbal or verbal communication between a teacher and a child which is affectively neutral (neither approving or disapproving to all appearances) and cannot be heard or interpreted visually should be scored as 3.

SUGGESTED ABBREVIATIONS FOR COMMENTS

SM - smiles
nods - nods with approval, acceptance
pts - points out child
hand - holds up hand for silence or attention
gl - glares
fr - frowns, scowls
ssh - puts finger to mouth to request quiet
shk - shakes head to indicate "no" or disapproval

NON-VERBAL DISAPPROVAL

P1 - physical aggression
P2 - physical restraint
Make a comment on situation

OTHER INFORMATION

C1 - child called on had hand raised
C2 - child called on did not have hand raised

- - - - - - - - -

A complete description of the categories listed in abbreviated form on the OBSERVER'S TSC SCHEDULE may be found in subsequent portions of this manual. A sample of the recording sheet used by the observer - the OBSERVER'S RECORD - follows this page.

R. L. Spaulding

Teacher-pupil Transactions
University of Illinois

OBSERVER'S RECORD

Teacher ______________ No. Boys ____ School __________ Observer ____________

Grade ______________ No. Girls ____ Date __________ Day ______________

#	Act Lev	Time Unit	Molar T	Dir	Pub	Remarks	#	Act Lev	Time Unit	Molar T	Dir	Pub	Remarks
		00							00				
		15							15				
		30							30				
		45							45				
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TRANSACTION SAMPLE: CLASSROOM (TSC) - SCORING MANUAL AND CODE
Used with simultaneous taping and observation

IBM Card Column No. 1-2: Teaching Identification

00 - 49	Male Teachers
50 - 99	Female Teachers

Columns 3-4: Grade Level Identification

00	Kindergarten	10	Combined 1st - 2nd
01	1st grade	20	Combined 2nd - 3rd
02	2nd grade	30	Combined 3rd - 4th
03	3rd grade	40	Combined 4th - 5th
04	4th grade	50	Combined 5th - 6th
05	5th grade	60	Combined 6th - 7th
06	6th grade	70	Combined 7th - 8th
07	7th grade	80	Un-graded or Non-graded Primary
08	8th grade	90	Un-graded or Non-graded Intermediate
		X7	Departmentalized 7th grade
		X8	Departmentalized 8th grade
		X-etc.	Departmentalized -th grade

X = "-"

Note: An "X" is punched as a minus "-" punch.

Columns 5-6: Number of Boys in Class

Columns 7-8: Number of Girls in Class

Column 9: Intensive Study Class Identification

1 - individual child-teacher transactions recorded
2 - individual child-teacher transactions not recorded

Columns 10-11: School Identification
(Code to be devised by user.)

Column 12: Observer Identification
(Code to be devised by user.)

Column 13: Month
(Use digits 1-9, then 0 = 10, "-" = 11, "+" = 12.)

Column 14-15: Day of Month

Column 16: Day of Week

1	Monday
2	Tuesday
3	Wednesday
4	Thursday
5	Friday

Column 17: Time of Day

0	8:00 a.m.	to	9:00 a.m.
1	9:00 a.m.	to	10:00 a.m.
2	10:00 a.m.	to	11:00 a.m.
3	11:00 a.m.	to	12 noon
4	12 noon	to	1:00 p.m.
5	1:00 p.m.	to	2:00 p.m.
6	2:00 p.m.	to	3:00 p.m.
7	3:00 p.m.	to	4:00 p.m.

Columns 18-19: Sampling Interval Size

The number punched indicates the size of sampling interval in seconds. In past studies, fifteen second intervals were used. This time interval was satisfactory for inexperienced observers in-training, but a ten second interval might be used by well trained observers. The lower limit of the time interval usable is a function of the experience of the observer, the number of judgments required in scoring, and their degree of difficulty.

Columns 20-22: Unit Identification

Each consecutive sample is identified by number. The observer records the chronological time of the first unit of sampling verbally using the auxiliary microphone and identifies the classroom and teacher. The tape analyst notes the time of first sampling as recorded by the observer and identifies each successive sample with a consecutive number. The counter dials on the tape recorder are set at zero for the first unit of sampling and a notation of the counter reading is made periodically to facilitate re-location of specific portions of the tape or particular samplings.

If a typescript has been produced, the tape analyst may indicate with a caret the exact moment of the sampling signal. This procedure will increase the reliability and rapidity of tape analysis.

Experience has shown that a well trained tape analyst can encode a full morning of transaction (using 15 second intervals) in approximately 10 to 20 hours, depending upon the complexity of transaction.

Column 23: Subject Area
(Both observer and tape analyst.)

1 - reading instruction, phonics, structural analysis, vocabulary, silent reading, skill development
2 - handwriting instruction, practice; cursive writing, manuscript, lettering, etc.
3 - English grammar, spelling, punctuation, composition, literature - instruction or practice
4 - arithmetic, mathematics, geometry, algebra, etc. - instruction or practice
5 - social studies, history, geography, government, civics, constitution
6 - science - biology, nature study, zoology, astronomy, chemistry, physics, science projects, etc.
7 - art, painting, sculpture, handcraft, applied art, drawing, mechanical drawing
8 - music - instrumental or vocal; music appreciation
9 - physical education, athletics, folk-dancing, rhythms
"-" X - foreign language instruction or practice (except singing); grammar, vocabulary, conversation, pronunciation
"+" Y - laboratory, study hour (any subject), general work time (no assigned project or subject area), etc.
0 - getting ready for recess, lunch; coming in from recess or at the beginning of the day; classroom mechanics; class meeting; sharing; unclassifiable

The observer scores the general subject area at the beginning of the period or when the class begins the study of the subject and makes a further note only when the general orientation of the class changes. The tape analyst scores every unit for subject area orientation.

Column 24: Activity Level (Observer only.)

0 - all children seated, at desks or at tables; no child standing or moving about
1 - one child standing, walking, or moving about - engaged in large muscle activity
2 - two children standing, walking, or moving about
3 - three or more children standing, walking, or moving about

The observer scores the activity level of the children in the classroom at each time sampling, at approximately five seconds before the signal. The tape analyst uses this information to provide context for judgments regarding the scoring of teacher behavior. The level of activity of the children can also be employed as a research variable.

Column 25: Molar Teacher Behavior
(Scored by both the observer and analyst.)

The observer's judgments may be used as additional cues available to the analyst in making an interpretation of the behavior to be scored.

1 - overtly approving; supportive statements or actions
2 - overtly disapproving; restraining, controlling, dominative, derogatory, depreciating statements or actions
3 - instructing, structuring, demonstrating, lecturing, assigning, commenting, inquiring, eliciting, directing statements or actions (categories 1 and 2 take priority over 3)
4 - listening; in communication with a child or group - to be distinguished from non-communicative listening (category 8); reading something a child has handed to the teacher while the child stands waiting

Note: The above four involve communication with the children in classroom. The following four do not.

5 - communicating or interacting exclusively with adults, visitors, etc.
6 - engaged in personal activity; scoring papers, reading, passing out papers, collecting papers, writing, etc.

7 - absent from classroom; in the closet
8 - observing children; may be listening but not in communication with children; watching a performance; surveying the class or a group
0 - unclassifiable

All behavior units are classified into one of the above categories. On occasion it is necessary to double score. For example, one teacher asked the class to criticize the oral report given by a boy. After a criticism was made the teacher agreed with the criticism - in effect approving the child who criticized and reproving the boy standing in front of the class listening to the criticism. Such double scored units are noted by marking a "1" in column 58. The appropriate sections - in this case, the approval and disapproval sections - are filled in on adjacent lines of the recording sheet but each line carries the same unit identification. Column 25 would be punched according to the section of the schedule filled in. In subsequent computations these double scored units automatically enter into the total unit frequencies within each molar category, but they can always be identified for special treatment if necessary.

Another situation commonly met is a highly charged pause following a reproving action by the teacher. If the signal to score occurs during this pause the last verbal behavior of the teacher - if it occurred not more than one sampling interval earlier - is scored. On occasion the teacher will wait for more than the sampling interval after reproving verbally. If such waiting is accompanied by glaring, scowling, or frowning it is scored as non-verbal disapproval.

A similar procedural rule is employed in scoring approval. If the signal occurs during a pause following approval, the last verbal behavior of the teacher is scored. Usually, the pause is accompanied by smiling and this non-verbal communicative behavior instead is scored.

In both of the above cases any verbal behavior of the class or a child intervening before the signal would invalidate the rule - and the listening or observing section of the schedule would be used.

What constitutes approval or disapproval is set forth operationally by citing teacher protocol behavior. These categories have been set for the purposes of initial research in this area and are subject to redefinition as subsequent theory may require.

The present schedule has been achieved after many hours of practice analyses using trial data from pilot classrooms.

Source or Seat of Authority, Ownership, Evaluation, Responsibility
(Tape analyst only.)

Column 26: Approval Source

Column 34: Disapproval Source

The analyst answers the question: How does the teacher phrase her approving and reproving verbalizations? She may specify herself - for example: "I like your story, Harry." - or she may be relatively impersonal - as: "That is a fine job, Mike!" The teacher, of course, always has the authority to approve and censure. The question is: In what way does this authority find expression in her verbal behavior?

1 - teacher-centered - "I." The teacher identifies herself.

"I like your story, Harry."
"I want you to stop your talk."
"You have my permission." (In response to a request.)

2 - teacher-class - "We." The teacher identifies the class as sharing her authority in approving or reproving some child or group.

"We all enjoyed your report, Fred."
"We don't like trouble makers in our classroom."
"The class is proud of you."

3 - class-centered. The teacher acts specifically as the agent of the class or a member of the class in expressing their feelings. She appeals to the authority of the class rather than to her own. (This category is expected to be used infrequently.)

"Many of you have told me how much you have enjoyed Mary's stories."
"Ted wants me to tell you how much he appreciates the attention you gave him."
"The class council has decided to suspend you from class meeting for two weeks."

4 - convention. The teacher does not identify the source of authority but approves in terms of the authority implicit in her role. All non-verbal approval and censure falls in this category.

"You have done a fine job."
"Yes, you may." (In response to a request.)
"Very good."
"OK, class, let's give her a chance."
"Sit down!"

5 - outside authority. The teacher acts specifically as the agent of some person external to the class. She may refer to a school authority, an author, or some member of society.

> "Mr. Alexander wants me to tell you how much he likes the way you filed out during fire drill."
> "Mrs. Louis has given our class permission to use her microscope."
> "Mr. Haywood wants you to be more quiet in the assembly hall."

Column 42: Instruction Source
(Analyst only.)

The analyst answers the question: To what degree does the teacher delegate her authority or appeal to other authorities as she instructs, structures, or manages the activities of the classroom? The teacher, of course, is charged with the responsibility and authority to direct the activities of the children in the classroom. The question at hand is: How does this authority and responsibility find expression in her verbal behavior? Does she hold on to it and dole out bits of freedom to act in specific situations or does she share broadly or delegate major portions of it on a provisional basis?

1 - teacher-centered - "I." The teacher retains as much authority as possible and doles it out piece by piece. She makes all the decisions and identifies herself as the person who has made each decision. The teacher refers to herself as the seat or touchstone of value, importance, or authority.

> "I want you to turn to page 22."
> "I'd like to have you see it, too!"
> "This is my job, and I want you to pay attention to the things I say."
> "Watch me and see how I do it."
> "What do I mean by 'perseverence'?"

2 - teacher-class - "We." The teacher shares her authority with the class and encourages the children to cooperate. The children have some

freedom of decision but the teacher identifies herself as sharing it rather than delegating it. (This may be a mere verbal formality.)

"Let's all say it together."
"Let's start with one."
"We don't have an 'Indian' for this group, yet."
"We are going to have a work period, now."

3 - class-centered. The teacher identifies the class or some member of the class as the source or seat of authority, value, responsibility, or ownership. She may appeal to the judgment or personal experience of the class or members of the class, delegate the responsibility to make a choice, or act as the agent of a child.

"How would you like a break now?"
"What do you think we should do to repair it?"
"Why do you think they put their milk in a gourd like that?"
"Mary, it's your turn to choose."
"Fred is ready now to have your papers."

Questions for which the teacher expects an answer - in contrast to rhetorical questions are scored in this category.

4 - convention. The teacher exercises her authority herself but does not identify herself specifically. She acts with the authority implicit in her role as teacher appealing to convention or constituted authority. When the teacher is discussing subject matter and makes statements as matters of fact this category is appropriate as the source of authority. Rhetorical questions, directives in rhetorical form, and directives to respond verbally are classified in this category.

"This is the continent of South America."
"The second method is best."
"Take your seats and begin your arithmetic."
"You read it and then tell us what happened."
"All right?" (No answer expected.)
"You see?" (No answer expected.)

5 - outside authority. The teacher identifies or refers to some outside person or group as the source of authority.

> "Webster's says it is pronounced to rhyme with door."
> "Mrs. Doering has asked us to write letters to the editor."
> "Some people like to put a zero in there."

0 - unclassifiable.

Direction of Teacher Communication (Recorded by observer.)

Column 27:	Recipient of Approval (Person or group affected is identified.)
Column 35:	Recipient of Disapproval (Person or group affected is identified.)
Column 43:	Direction of Instruction
Column 51:	Direction of Listening

At the moment of sampling the observer identifies the person or group of persons to whom the teacher is directing her communication. If she is approving or disapproving the recipient of her approval or disapproval is identified, even if she directs her remarks to the class as a whole for "ripple" effect. The scoring is made according to the following categories:

1 - class as a whole
2 - sub-group (any formal or designated sub-group; also used for scoring communication within informal sub-groupings when the particular person cannot be ascertained)
3 - boy
4 - girl
0 - unclear, unclassifiable

When listening to the tape the analyst is able frequently to reclassify reliably the direction of communication; as, for example, when the teacher's remarks have included the name of the child with whom she was communicating.

Child Identification (Recorded by observer when specific child-teacher transactions are under intensive study.)

Columns 28-29:	Child Identification - Approval
Columns 36-37:	Child Identification - Disapproval
Columns 44-45:	Child Identification - Instruction
Columns 52-53:	Child Identification - Listening

When transactions with specific children are studied one procedure would be to make a sketch of the seating arrangement of the class and observe for a few days until the names of the children are learned. Immediate recognition is necessary for adequate scoring in a highly active classroom.

Another column (Col. 9) is reserved to identify those classrooms in which specific child-teacher transactions have been recorded.

Publicity (Recorded by observer.)

Column 30:	Approving Publicity
Column 38:	Disapproving Publicity
Column 46:	Instructing Publicity
Column 54:	Listening Publicity (Publicity of child's communication.)

1 - all or most can and do hear; if non-verbal - all or most do take notice
2 - a few nearby can and do hear; if non-verbal - a few do take notice
3 - no one else hears or takes notice; if non-verbal - no one else takes notice

A further coding procedure is followed. When the teacher was obviously speaking or listening to a child and could be observed so doing by the class, but no indication of approval or reproval could be detected, the publicity of the communication is recorded as 3. If, however, the transaction observed indicated approval or censure of the child the unit is coded in any one of the three publicity categories above, according to the number of children taking notice.

The publicity being scored, therefore, is the publicity of the content itself, or, if present, the affective quality of the communication - not the act of communication.

Many times the teacher's remarks are loud enough to be heard by all of the children but only a small group attends to them. For example, during reading instruction several groups of children may be reading in various books and another group may be discussing assigned material with the teacher. When those not in the discussion group are attending to their own tasks of reading (from all outward indications) the publicity of the communication is scored 2 - that is, "a few take notice" - the few being the children in the discussion group.

Tone or Mood (Scored by both observer and analyst.)

The observer records situational cues to the teacher's mood and notes facial expressions and other non-verbal communicative signs related to mood. The analyst uses these observer comments and notes to interpret the situation in which a particular sampling occurs.

Column 31:	Tone (Mood) of Approval
Column 39:	Tone (Mood) of Disapproval
Column 47:	Tone (Mood) of Instructing

1 - normal tone of voice and manner, matter of fact, unmoved
2 - accepting, pleasant, sympathetic, warm, interested; smiling; enthusiastic
3 - humorous, gay, joking, laughing, silly
4 - firm, serious, concerned, directive; doubting, skeptical, astonished
5 - angry, hostile, glaring, abusive, harsh
6 - hurt, pained, unhappy, crying, painfully discouraged, disgusted, whining, sarcastic, annoyed
0 - unclassifiable

In practice the shift from the normal voice and tone of the teacher is scored in one of the categories 2 through 6. In past studies some rather harsh and strident voices were scored 1 since the rather harsh manner appeared to be the normal way of speaking for the teacher in question. The scoring, therefore, is oriented toward affective shifts in the tone or mood of the teacher rather than to the abstract quality of the voice itself.

Column 32: Approval Technique
(Observer scores non-verbal reward.)

1 - emphasizes, repeats with falling inflection, agrees with child, indicates correctness without evaluation, gives a nod of acceptance in a matter of fact way, agrees to examine problem of a pupil, writes child's response on the board, elicits confirmation of teacher's understanding of child's statement (skepticism absent)

"Uh huh."
"All right."
"Yes."
"Oh yeah." (Not doubting, just acknowledging.)
"Right."

Teacher: "What is the square root of 16?" Child: "Four."
Teacher: "Four." At the moment of sampling the teacher is saying: "Four."

2 - evaluates responses, behavior, or performance of child or class in a positive way; makes a judgment of value or of the quality of behavior carrying greater approbation than under category 1 above; praises; expresses liking or gratitude for action or response of child or class

"Very good."
"Fine."
"You have done very well."
"I like that very much."
"Good."

3 - elicits group attention, calls attention to an approved behavior, holds up a product of some child or group for all to see

"Listen to what Joan is saying - she has a good idea!"
"I want you to see what John has done."

Category 3 is given priority over other categories of approval when it is appropriate. After the first "calling of attention" subsequent approving behavior of the teacher may fall in other categories of the schedule. For example, if the teacher calls attention to the careful planning done by some child and then spends considerable time outlining in detail what planning the child did, the elaborations would be coded as their content would require.

4 - redefinition plus; elaboration of an idea suggested by a child; releasing a child from normal expectations due to extenuating circumstances cited by a teacher; tentative acceptance of a suggestion with a qualifying phrase

"Well, you had a reason for it."
"That's partly right."
"This mountain is beginning to look like a real volcano."
(Said to a child working on a project in social studies.)

5 - gives verbal or non-verbal support, encouragement; shows appreciation verbally or non-verbally; expresses confidence, enjoyment; shows affection with expression, gesture, or physical contact; gives assistance in finding something in a book (not instructing or demonstrating); gives gratuitous cues to an answer, provides an answer when child is stammering, or has made an acceptable attempt to respond; smiles or laughs while child is communicating with the teacher, or when the class has responded exuberantly to some event; complies with a request for help; walks toward a child whose hand is raised for assistance

"That is a hard problem, isn't it, Fred?"
"I see some hands up. How many more have an idea?"
"I'll be right with you, Mike."

6 - takes role of equality with child; becomes a coparticipant; uses expressions of common courtesy among equals; becomes a member of group in putting on a skit; follows suggestions of a child; tells jokes, makes a play on words for enjoyment of class; cheers a group engaged in play; apologizes for disrupting some activity of a child or the class

"Thank you."
"You're welcome."
"I fooled you again." (Laughing, as she plays a game with the class.)
"I'm sorry."
"Pardon me."

7 - expresses sympathy with child, gives reassurance; shows understanding; gives a pat on back, smiles at a child having trouble; shows sympathy for effort made; shows concern for problems, comfort; elicits condition of child or class - e.g., comfort, fatigue

"That's pretty hard for you, isn't it, Jane?"
"Oh, that's a pretty bad scrape!"
"Well, how's it going?" (To child struggling with an assignment.)

8 - offers or gives special privilege, tangible gift, superior mark or grade; offers or gives power to reward or disapprove, or make assignments; delegates power or authority; agrees to child's request to have some special privilege; grants a request for some special consideration; elicits judgment of a child setting him up as an authority on the subject

"Since it's Steve's project, we'll let him ask the questions."
"That table is quiet. They can go out to recess first."
"I'm giving you an A on that report since you worked on it so hard."

9 - shows personal interest in child's concerns; comments on the interests, experience, or possessions of a child or the class (non-academic areas - in this case), elicits non-academic personal experiences, interests, possessions

"Wow!" (In reference to a child's personal experience.)
"Wild!" (In reference to a story related by a child.)
A child shows the teacher a mortar and pestle and the teacher remarks: "In early Egyptian civilization they used this, Lila." (The child in this case being a recent emigrant from Egypt.)
"My! That's a fine watch!"

0 - unclassifiable

Column 33: Regarding: Aspect of Behavior Approved
(Observer records relevant cues.)

In this section of the schedule the analyst answers the question: What aspect of the child's behavior is the teacher approving?

1 - pro-social behavior, deportment, acceptance of social responsibility, adherence to rules, courtesy, respect for classroom standards as evidenced by appropriate behavior

"Roger's working so quietly."
"Table Three worked very well today."
"You'll be in charge." (To class president, as teacher leaves.)
"Thank you." (Child has held the door for the teacher.)

2 - personal qualities: disposition, vivacity, exuberance, enthusiasm, honesty, character; genetic attributes, intelligence; personal rights, rights to comfort, consideration, equality of treatment; rights to hear and to know what is expected; rights to happiness, enjoyment of humor, pleasure; personal dignity

"You have a fine mind, Harry."
"You remind me of your father, Fred."
"I'll say it again so you can hear it."
"I know you can do it!"

Many non-verbal communications of affection and encouragement are scored in this category. For example, in the case of a teacher who smiled when he first entered the room in the morning - such approving behavior was scored in this category. (2).

3 - personal interpretations, ideas, judgments; evaluations, suggestions; cleverness, humor (ability to create humor); personal contribution in a discussion, sharing, etc.; creativity, thoughtfulness, awareness, sensitivity, imagination

"That's a wonderful idea, Louise."
Child: "It's like magic." Teacher: "It's sort of like magic, isn't it?"
The teacher smiles at a humorous story related by a child.

4 - planning, organization, knowledge of task requirements - as shown by some product or the completion of an assignment; work habits, neatness; completion of assignment on time; knowledge of daily schedule, knowledge of task organization as planned by the teacher

"Mary, your schedule looks fine."
"That's a nice job, Mike."
"Well, I see you all have the right page!"

5 - correct or accurate knowledge; skill; evidence of ability, achievement, correct knowledge; quality of academic performance or recitation - with emphasis upon correctness, accuracy, or acceptability rather than originality or creativity; accurate memory; knowledge of teacher's criteria, values

"Andy, your math homework was one hundred percent correct."
"That's a very good triangle."
"Yes!" (In response to an answer in mathematics.)
"Excellent!" (Child has recited a poem.)
"Correct."

6 - attention to task assigned, effort; academic task responsibility, intentions, motives, goals, purposes, cooperation (in the past or intended by child), desires; academic needs; importance of problems of child or class

"That was a good work period, class."
"You may." (Child asked to pass papers.)
"You worked hard, today, Mike."

7 - personal grooming, cleanliness, personal hygiene, neatness of clothes

"You really got your hands clean, didn't you?"
"I'm glad to see you carrying a handkerchief now, Mike."
"You look very nice in your new dress, Jan."

8 - personal interests (outside of school or extracurricular); personal experiences, family activities or interests; personal possessions, hobbies

"How was your summer, Mike?"
"That's a beautiful watch, Mary."

Column 40: Disapproving Technique
(Observer scores non-verbal disapproval.)

The following disapproving techniques have been grouped in several ways.

The first eight (categories 1 - 8) are direct in the sense that the person or group disapproved is clearly identified. It may be a child, sub-group, or the class as a whole.

The ninth category (9) is indirect. Individuals are not identified - instead the teacher preserves a degree of anonymity with regard to the persons disapproved. She reminds or warns and lets those who are responsible for her concern remedy the situation without further identification.

Categories X and Y (punched as "-" and "+") involve an attempt on the part of the teacher to identify causes or consequences of the disapproved behavior or the purposes of the teacher in censuring the child or class. Technique X involves the direct identification of causes or effects, while technique Y pertains to an attempt to elicit the causes or consequences from the child or the class. Specific individuals may or may not be identified.

1 - physical disapproval; shaking, slapping, ear pulling, spanking, etc.

The observer scores all non-verbal aggressive physical contact in this category. Physical restraint such as interfering in a fight is scored in category 2. Forcibly removing a child from the classroom may not occur, but if it should happen it would be scored under category 2 if it was done without apparent intent to hurt physically.

2 - physical restraint; isolation; exclusion, banishment; sending child to office, removing child's desk to a corner of the room, etc.; removal of a possession of a child (separating the child from the source of "trouble")

"Harry, move your things to table outside."
"Sit at that table for the rest of today, Fred."
"March right down to Mr. Doer's office."

3 - social shaming, belittling, ridiculing, using sarcasm; public castigation; singles out a child and berates him; implies far fetched consequences, calls the attention of the class to the failure of some child; elicits appropriate punishment, elicits agreement from child with the negative evaluation made by the teacher; asks questions of a child who has not been paying attention until his attempts to answer are belittled or ridiculed

"That was really bright, John!"
"How is it when I ask you people who are always calling out or undertoning you don't have an answer?" (Rhetorical question.)
"Would it be too much to ask you to stop talking?"

4 - commanding conformance; directing explicitly appropriate behavior; assigning extra work in retribution, retaining after school or during recess; assignment of a test in retribution; requiring completion of some additional onerous task

"Write this sentence one hundred times."
"All right, Mike! For that you will have to do page ten as well."
"Mary, be quiet."
"Shhhh!" (to a child)
"Sit!" (to a child)
"We will sit right here until all of you have calmed down!"

5 - negative evaluation; direct contradiction of the opinion of a child; qualifying a child's response negatively; assignment of a low grade; teacher redefines the response of a child in a negative way; points out inadequacies of the class or a child; states what is appropriate, gives an example of what is expected, recalls past instructions, elicits teacher's instructions; corrects mispronunciation or incorrect grammar verbally

"You are wrong."
"No. That's not it."
"You can't intersect a plane with a point." (After child has done so on his paper.)
"Randy, come up to me next time, instead of shouting."

This category stops short of commanding or directing behavior, yet the response of the child or class clearly is evaluated negatively. There is no apparent intent to ridicule or belittle the behavior in question, but rather to redefine the situation, identifying errors, inappropriate behavior, or inadequate responses. Whenever the identity of the person or group of persons being reproved in this fashion is left ambiguous by the teacher category 9 is used instead.

6 - withdrawal of privilege; denial of a request

"No, you can't now."
"I'm sorry, Mike. I'm assigning a new librarian."
"I'm taking you off patrol for the rest of the week, Peter."
"For the rest of the period I want you to stay in your seats."

This category is distinguished from 4 in the sense that what the teacher requires involves the loss of some extended privilege rather than the addition of some unpleasant task. Both may have an attending air of recrimination.

7 - withdrawal of love; the teacher makes herself unavailable; she puts off the efforts of a child to seek help, refuses to listen

"I'm not going to listen to you, John!"
"I don't like you when you do that!"
"I know, I know. Now, don't bother me.
"I'm busy, now!"

8 - veiled or explicit threat to rebuke in a more direct fashion; teacher warns, reminds, cautions, urges appropriate behavior; shows shock or pain; asks rhetorical questions implying lack of attention or thought; elicits description of situation to identify persons responsible for wrongdoing; elicits what is "proper" in order to justify disapproval to follow; doubts child's intentions, repeats child's statement with rising inflection

"If you don't stop that I'll keep you in during recess!"
"This is the last time I'm going to warn you!"
"All right, Jim!"
"John!" (John and the teacher know what she is talking about and she waits for him to conform to her desire.)

The direction of the teacher's controlling or disapproving behavior is clear to all who take notice. There is no attempt to protect the object of censure by an anonymous warning in this case. Such anonymous warnings are scored under category *9*.

9 - *anonymous or impersonal warnings*; teacher warns, reminds, cautions without identifying anyone in particular or speaks to the class as a whole; states what is appropriate, gives a positive example, recalls or elicits past instructions, urges or requests cooperation, pleads, asks rhetorical questions implying lack of attention or effort, deplores possible inappropriate motives, preaches morality

"Remember how we are supposed to clean up."
"Keep your voices low as possible."
"It's getting noisy again."
"Page nineteen, please!"
"I'm waiting!"
"I asked you to get your spelling books out!"

"-" X - *identification of causes, effects*; teacher evaluates the situation explicitly, identifying causes or consequences of inappropriate pupil behavior; identifies sources of error, elicits agreement with teacher's evaluation of situation (rhetorically); reasons with child or group; justifies own behavior at expense of child or class; states own purposes in justification of negative evaluation

"We won't get through today if we don't pay attention."
"You forgot to carry the tens, Janice."
"You added in the carry twice."
"I'm waiting because I want to hear everyone and I want *you* to be able to hear everyone."

The object of disapproval may be either anonymous *or* identified. The distinguishing characteristic is the identification of causes, effects, etc.

"+" Y - *eliciting clarification* of situation *in a non-threatening way*; teacher elicits clarification of goals, needs, errors, defects in performance; elicits child's evaluation of performance, child's agreement with teacher's evaluation (not rhetorical); elicits confirmation of teacher's understanding of child's reasoning, ideas, purposes

"What were you trying to do?" (Non-rhetorical questions only.)
"Where did you get the five?" (In regard to a problem in arithmetic.)

"Was it successful?" (Asking a boy to evaluate his behavior over the past week - having earlier been put on trial for losing his temper.)
"Do you think there's any value in trying to hold your temper?" (Not said sarcastically, but with interest in child's view.)

If the teacher elicits clarification in such a way as to threaten or belittle a child or a group categories 3 or 8 - as appropriate - should be scored.

0 - unclassifiable

Column 41: Regarding: Aspect of Behavior Disapproved
(Observer records relevant cues.)

1 - violation of rules, behavior standards; anti-social behavior, lack of respect or consideration for others; discourtesy; irresponsibility with respect to safety, school property, facilities, equipment; wanton destruction of property, materials, equipment

"John!" (Glares.) (John has been shooting rubber bands.)
"You are all too noisy."
"Stop talking!"
"Don't run!"
"I'm lost again because I'm trying to hear more than one person at a time."
"Randy come up to me, honey, instead of shouting."

2 - personal qualities, character; memory, ability (rather than achievement), intelligence; genetic attributes; honesty; egocentricity; exaggeration of own importance; self-control; emotional maturity

"Do you think there's any value in trying to hold your temper?"
"Why are you so stupid?"
"Half an hour! Now really, Tim!" (Child exaggerates time spent working on problem in class.)

3 - thoughtlessness, lack of imagination; lack of awareness of environment; lack of ideas; poor judgment, reasoning

"That's kind of silly! Let's do some good thinking."
"Come on people, think!"

4 - task mechanics; task organization, neatness of papers, lack of care in using materials, books; wastefulness; lack of planning, lack of forethought, carelessness with materials; slipshod work

"This paper is much too messy!"
"How about getting your pencils sharpened when you first come in!"
"Don't bend the cover back, Fred!"

5 - lack of knowledge, skill; incorrect or unacceptable academic performance, inappropriate answers (where correctness or preciseness rather than the quality of reasoning or judgment is reproved)

"No, Mike, not 24!"
"Wrong."
"No." (In response to a child's answer to a problem.)
"That's not right!"
"You know, I think I became so captivated with your language I missed all these errors."

6 - lack of attention to task at hand, lack of effort; lack of concern for the interests and efforts of the teacher (in the classroom); failure to listen to instructions; inadequate or reprehensible intentions, motives, goals, relative to the classroom situation; lack of diligence, application, acceptance of responsibility, commitment

"John!" (John has been reading a comic book.)
"I'm waiting." (While children mill around after being asked to get ready for arithmetic.)
"You're in my book as 'didn't do'."
"I didn't see a single dictionary open up!"

7 - housekeeping; neatness of desk; neatness of clothes; cleanliness, personal hygiene

"Clean your desk, Mary."
"What a mess your desk is, Peter!"
"Go wash your hands before you come to class."

0 - unclassifiable: unclear; scapegoat attacks, etc.

Column 48: Instruction Technique
(Observer scores non-verbal techniques.)

1 - stating facts authoritatively; expressing ideas, feelings, experiences confidently; observing the status of events in an assured manner; explaining discrete events in a factual way, commenting, asking rhetorical questions; giving reasons, giving

examples; teacher demonstrates to illustrate a point; writes answers on the board; reads from a book orally; confirms statement of fact in response to question of a child; recalls past events

"This is the continent of South America."
"It is made of iron and bolted to the floor."
"I wanted to go to Lisbon."
"They have brought back the dogs from space."

2 - commenting or suggesting in a non-authoritative manner; expressing ideas, possibilities, hypotheses, predictions, tentative answers or solutions (error admitted as possible or probable); expressing doubt, asserting lack of adequate knowledge; offering alternative ways of working

"I believe that it would evaporate."
"There may have been other men living there."
"I expect that it would fall until it burned up in the atmosphere."
"I don't know."

3 - explaining a process involving several steps in an authoritative manner; showing or demonstrating how one ought to proceed; guiding a child or the class through a complex process; leading a group in singing

"But we must indent or skip over because actually we're multiplying by the tens."
"Two times six is twelve, put down the two, carry the one."
"Mix the paper bits with water and paint until it gets pulpy and evenly colored."

4 - directing or requesting a discrete action; giving instructions, making assignments, emphasizing task requirements, confirming a question regarding instructions; giving permission to proceed as assigned; demonstrating a discrete action; directing a simple discrete task; requesting a child to recite, read, or pronounce a work, etc.; writing problems on the board to be answered

"Take out your arithmetic books."
"When you finish your compositions, take out your library books."
"Would you read us what an adjective does, Harry?"
"All right. Go ahead - see what you can come up with."
"Tom, would you lift the saddle off of that, please?"

If the teacher is helping a child by giving encouragement and support, rather than instructions, the approving section of the schedule is used.

Also, proscriptions in contrast to prescriptions are scored in the disapproving section.

5 - evaluating, judging authoritatively (if non-authoritative use category 3) stating what is good or bad, correct or incorrect where difference of opinion is common; asserting a thing to be true or not true contrary to someone else's opinion (if contradicting the expressed opinion of a child in the class score in the disapproval section); making an analogy to show adequacy or inadequacy; predicting what will happen in an assured manner; preaching, moralizing

"It is very difficult to pick out the facts when you have a whole paragraph."
"You would lose a certain feeling that goes along with this paragraph."
"The train service in Spain leaves much to be desired."
"They should have used experimental animals rather than a human being."
"Now, the first step is fairly easy."

6 - eliciting a verbal response in an open-ended fashion; eliciting a choice, hypothesis, prediction, possible solution, possible way of proceeding; eliciting a confirmation of a hypothesis; eliciting a response within certain limits (with some degree of freedom); eliciting a judgment, opinion, interpretation; eliciting child's condition, need, interests, problems

"Why do you think the verb is important?"
"What would people feel if they knew?"
"What else do you need?"
"Have you thought about covering it with brown paper?"
"What should we do next?"

7 - eliciting a specific or solution that the teacher has in mind; testing recall; giving dictation; pronouncing spelling words to be spelled on paper or orally; giving mental arithmetic problems; writing problems on board to be answered orally by members of the class; eliciting correct pronunciation of a word

"Who discovered America?" (Teacher has Columbus in mind and tolerates no other answer.)
"What is the square root of sixteen?"
"Where do you place the exclamation point?"
"What is the subject of this sentence?"

Eliciting non-verbal responses are generally scored under category 4. Spelling dictation is scored in this category (7) as a special form of eliciting recall.

0 - unclassifiable

Column 49: Regarding: Aspect of Instruction
(Observer records relevant non-verbal cues.)

Column 56: Regarding: Aspect of Child's Communication
(When teacher is listening.)

The scoring of the aspect of the child's communication is made by the analyst after listening to the complete transactional sequence eclipsed at the signal. The observer records the listening orientation of the teacher, as distinguished from observation, or personal activity, etc., but the analyst classifies the content of the communication after a sequential analysis of the recorded verbal behavior of the teacher and the child (or children).

1 - factually reported subject matter; statements or questions by pupil or teacher regarding some fixed or established body of knowledge or historical event; regarding artifacts or realia in Social Studies; regarding proper manipulation of materials, or skill in performance of an assigned task

"What is the square root of sixteen?"
"This is the continent of South America."
"Who discovered America?"
"What is the subject of this sentence?"

This category is scored whenever the content of instruction or the nature of the communication by the child is oriented toward a fixed or commonly accepted body of knowledge.

2 - child's interests, interpretations, or experiences; pupil interpretations of subject matter where no fixed body of knowledge

is extant; teacher statements or questions regarding condition or status of child or class; regarding pupil interests, knowledge, judgment, needs, plans, desires, values, goals, comfort, psychological set, personal experiences, family experiences, possessions

"Imagine what it would be like to have lived in those days!"
"What else do you need?"
"What should we do next?"
"Can you tell us some interesting things you saw?"
"What would the people feel if they knew?"

Whenever the teacher shows personal interest in the child's communication rather than a businesslike, academic orientation the approval section of the schedule is used.

3 - classroom procedure, task mechanics, assignments, clarification of assignments, orientation to assignment; daily schedule; arranging desks for work time or grouping; condition of room, standards set in advance for use of materials, equipment; eliciting class officers; use of materials in process of production (for example: mixing paint where the mixing itself is not the subject matter of instruction)

"Write down any words you have difficulty with."
"I'll keep these papers until we discuss them tomorrow."
"Do the problems on page 38."

4 - teacher's personal condition; her personal interests, values, feelings, experiences, goals, aims, ideas, comfort, hopes; teacher's interpretations of subject matter where there is no fixed or accepted body of knowledge; listening regarding pupil comments on teacher's condition

"My voice is giving out, so I'll have to ask you to be especially cooperative."
"I spent the week-end at the beach."
"What do I mean by 'presentation'?"
"Remember this is Socrates and I want to know the why - always the why."

5 - peer relations; human relations in general - but not as classroom subject matter or in connection with setting classroom standards or arranging task mechanics; non-punitive private counseling regarding social relations

"Please open the door for Mrs. Franz."

Eliciting non-verbal responses are generally scored under category 4. Spelling dictation is scored in this category (7) as a special form of eliciting recall.

0 - unclassifiable

Column 49: Regarding: Aspect of Instruction
(Observer records relevant non-verbal cues.)

Column 56: Regarding: Aspect of Child's Communication
(When teacher is listening.)

The scoring of the aspect of the child's communication is made by the analyst after listening to the complete transactional sequence eclipsed at the signal. The observer records the listening orientation of the teacher, as distinguished from observation, or personal activity, etc., but the analyst classifies the content of the communication after a sequential analysis of the recorded verbal behavior of the teacher and the child (or children).

1 - factually reported subject matter; statements or questions by pupil or teacher regarding some fixed or established body of knowledge or historical event; regarding artifacts or realia in Social Studies; regarding proper manipulation of materials, or skill in performance of an assigned task

"What is the square root of sixteen?"
"This is the continent of South America."
"Who discovered America?"
"What is the subject of this sentence?"

This category is scored whenever the content of instruction or the nature of the communication by the child is oriented toward a fixed or commonly accepted body of knowledge.

2 - child's interests, interpretations, or experiences; pupil interpretations of subject matter where no fixed body of knowledge

0 - unclassifiable

Column 50: Sequential Reinforcement or Non-reinforcement
Column 57: (Analyst scores during instruction and listening.)

When a teacher is engaged in instruction or listening to a child she may proceed in such a manner as to reinforce or fail to reinforce the immediately previous behavior of a child or the class - or some relevant earlier response or behavior. This may occur in the absence of any overt approving or reproving behavior on the part of the teacher.

For example, the teacher may move from one question to another with each new question signalling the acceptance by her of the immediately previous response. Or, in contrast, she might persist in putting the same question to a child in the same form or with slight variation - indicating that each attempt on the part of the child to answer is in some manner unacceptable. In another instance, the teacher might move from child to child asking the same question, searching for someone who can supply a satisfactory response.

The first transactional process - with the teacher indicating, by her movement from the consideration of one topic or question to the consideration of a new facet of the subject, that the response of a child or the class was acceptable - is scored as positive sequential reinforcement. The second situation is categorized as negative sequential reinforcement - with the negative scoring repeatedly applied until, finally, some acceptable response brings the whole train of events to termination, with some lucky child receiving the concluding allocation of positive reinforcement.

In general, if the line of questioning or interaction tends to put the child or the class on the defensive, negative sequential reinforcement is scored. If the child or the class is encouraged to expand or continue, positive sequential reinforcement is recorded. When the teacher moves from one topic to another - or when the process is ambiguous - the sequence is scored neutral with regard to reinforcement.

1 - positive sequential reinforcement

2 - negative sequential reinforcement

0 - neutral or unclassifiable

The following transcription of a classroom discussion in mathematics is provided to illustrate several types of sequences and the affective loadings assigned. The transcript does not exhaust the variety of sequences which were scored but is intended as a suggestive series of interactions and scorings.

The time samplings are indicated by an asterisk (*). Interpretative comments, the scoring made, and brief comments regarding the scoring are enclosed in parentheses.

Teacher: "How many planes can we have with two line segments?"
(Pause)

Teacher: "Richard?"

Richard: "None."

Teacher: "None!" (Falling inflection - overt approval.)

Teacher: "How many planes can we make with one line segment?" *
(Pause)

(Positive sequential reinforcement - Teacher asks different question after having given overt approval.)

Teacher: "Mike."

Mike: "One."

Teacher: "Hmmm." (Pause) (Sequence ambiguous.)

Teacher: "How many planes can we make with three line segments? Assuming they are all joined, of course."
(Pause)

Teacher: "Big Daddy?"

Child: "One."

Teacher: "One!" * (Falling inflection - overt approval.)
(Teacher laughs.)

Teacher: "How many planes - now listen, now - be careful! How many planes can we make with four line segments?"
(Pause)

Teacher: "Peter?"

Peter: "Uh - three?" * (Positive SR - listening following overt approval.)

Teacher: "Oooooh!" (Pained)

Peter: "Two."

Teacher: "Ahhh." "Wait a minute, now. Let's go back."

Teacher: "How many planes can we make with four line segments?"
(Pause)

Teacher: "Ted?"

Ted: "Two." * (Negative SR - listening following a repeated question.)

Some general operation rules have emerged from this type of analysis. In general the following procedures should be adhered to in scoring the tapes:

1. The first unit of listening to a child who is called on carries a sequential loading (positive, negative or neutral) based upon the

relationship of the current question (now being answered) to the question asked previously and the nature of the response the teacher made to the earlier answer. In the sequence transcribed immediately above, the sampling unit including Ted's response was scored negative since the teacher repeated an earlier question which had not been answered to the teacher's satisfaction. (Note: The child receiving the non-reinforcement in this case was Peter - not Ted.)

If the teacher's response had been approving (overtly), as it was in the case of Richard or "Big Daddy," the next question and the listening sequence following (if sampled) would have carried a positive SR loading.

2. After the first sampling unit during a listening sequence in which a child has been called upon (not desiring to speak - hand not raised), subsequent samplings are scored neutral with respect to SR. If the teacher interrupts the listening sequence, the next sampling unit is based upon the affective loading of the teacher interjection.

3. When the sampling signal occurs during a teacher response representing compliance with the request of a child or the class positive SR was scored.[1]

4. When sampling occurs during a listening sequence, following an indication by the pupil of a desire to speak (hand raised, approach to teacher, etc.), positive SR is scored throughout the listening sequence.

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[1] In a study by Richard deCharms and W. J. Bridgeman, Washington University, college students were observed to report more "security" ($p < .05$) when teachers complied clearly with their requests - in contrast to ambiguous compliance. Paper presented at American Educational Research Association Chicago, February 22-25, 1961.

5. When the teacher continues to instruct with no interruption by a child or the class the SR is scored zero - i.e., neutral.

6. Observing - and listening in that sense - to an exchange between students is not scored for SR at all. It is coded as category 8 (observing) in column 25.

7. A teacher instruction unit following teacher approval carries a positive SR if the instruction sequence is on the same general topic. Subsequent instruction units are scored positive if the teacher continues to refer to the approved pupil response.

8. A teacher instruction unit following a teacher disapproval regarding a lack of skill or lack of knowledge is scored as negative SR.

9. A teacher instruction unit following teacher disapproval regarding some behavior other than lack of knowledge or skill is scored neutral.

10. Any sequence in which the teacher moves to an entirely new topic is scored neutral. However, movement to a new phase of the same subject occasions a positive SR.

11. After the correction of a child for mispronunciation in oral reading - or some other failure to perform correctly - the next listening sequence is scored positive if the troublesome word or task is handled by the child in such a manner that no further interruption by the teacher with regard to the error occurs. After one such listening unit of sampling has occurred and is scored positive, the following listening units sampled are scored neutral.

12. Calling on a child whose hand is raised occasions the positive

scoring of the subsequent listening sequence - provided no overt disapproval for lack of skill or knowledge precedes the act of recognition and the listening sequence.

13. The negative SR loading attending a switch from one child's inadequate response to the recognition of another child who indicates a desire to answer takes precedence over rule No. 12, above.

Column 55: Listening Technique
(Observer records the orientation of the teacher.)

1 - attentive listening; the teacher gives complete attention to speaker; turns head in direction of child speaking

cues: eyes are on speaker
does not carry on personal activities
may bend down in order to hear better

2 - divided attention while listening; teacher shows distraction, lack of concentration on speaker

cues: eyes frequently stray from speaker
occupied with papers, other personal matters
head is not oriented toward speaker

0 - unclassifiable

Column 58: Double Scoring

The tape analyst records all double scoring in this column by means of a "1" punch. All other units of analysis receive no punch in this column. Double scored units may be sorted out for separate analysis if desired.

TRANSACTION SAMPLE: CLASSROOM (TSC)
TAPE ANALYSIS RECORD

The following sample sheet from the TAPE ANALYSIS RECORD illustrates the method to be used in scoring the tapes. The analyst fills in the appropriate figures in the blanks at the bottom of the sheet from the information provided by the OBSERVATION RECORD. Units are identified serially in the first columns to the left (Col. 20-22). The Activity Level of the children at the time of sampling is transferred from the OBSERVATION RECORD. The analyst then listens to the tape until a sampling signal is heard, stops the tape recorder momentarily, and scores in the appropriate columns. If necessary the tape can be replayed several times to gain a full understanding of the sampled events.

A notation of the tape recorder counter reading at each sampling is kept in the left hand margin - but is not punched on cards. The counters are set at zero to coincide with the first unit sampled. Thus, if a particular unit were to be listened to at a later time, the proper position of the tape reels could be obtained easily.

The column identification numbers located at the head of each column are keyed with the sections described in the TSC MANUAL.

				APPROVING								DISAPPROVING								I
UNIT I. D.	Subject	Activity	Molar Beh.	Source	Direction	CHILD I. D.		Publicity	Tone	Technique	Regarding	Source	Direction	CHILD I. D.		Publicity	Tone	Technique	Regarding	Source
20 21 22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42

(1-2)Teacher _____ (5-6)No. of Boys_____ Intensive Study (10-11)School _____ (13)
(3-4)Grade _____ No. of Girls_____ (9)Yes___No___ (12) Observer_____ (14-15)

PPROVING					INSTRUCTING									LISTENING							
HILD D.	Publicity	Tone	Technique	Regarding	Source	Direction	CHILD I.D.		Publicity	Tone	Technique	Regarding	Sequen. R.	Direction			Publicity	Technique	Regarding	Sequen. R.	Double Score
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58

-11)School ____ (13) Month ____ (16) Day of Week ____ (18-19) Size of Interval ____

) Observer ____ (14-15)Day of Mo. ____ (17) Time of Day ____

Table

Reliability Estimates for Pupil Tests

Instrument	Source of Data	Form	Grade Level of Reli.	Grade at which Used	N	Score	No. of Items	Relia- bility	Mean	S.D.[a]	S.E.[a] Meas.
SCAT	Technical Report ETS Cat. No. 150-00-9 (Page 11)	5A	5th	4th	2226	V	50	.94[b]			2.71
						Q	50	.88[b]			2.99
						T	100	.95[b]			4.05
		4A	7th	6th	2662	V	60	.94[b]			3.07
						Q	50	.91[b]			2.90
						T	110	.96[b]			4.23
STEP Reading	Technical Report ETS Cat. No. 031-00-9 (Page 10)	4A	5th	4th	277	Total	70	.95[b]		14.84	3.45
		3A	8th	6th	480	Total	70	.90[b]		11.23	3.62
STEP Writing	"	4A	5th	4th	273	Total	60	.89[b]		10.62	3.53
		3A	8th	6th	464	Total	60	.88[b]		9.86	3.47
STEP Listening	"	4A	5th	4th	805	Total	80	.93[b]		13.45	3.61
		3A	8th	6th	1102	Total	80	.89[b]		11.48	3.80

(Table continued on next page)

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[a] In raw score units.

[b] Kuder-Richardson Formula 20 (estimate of internal consistency). This formula results in spuriously high coefficients when used with speeded tests such as SCAT and STEP.

Table (continued)

Instrument	Source of Data	Form	Grade Level of Reli.	Grade at which Used	N	Score	No. of Items	Reliability	Mean	S.D.[a]	S.E.[a] Meas.
STEP Math.	Technical Report ETS Cat. No. 031-00-9 (Page 10)	4A	5th	4th	253	Total	50	.89[b]		9.02	3.05
		3A	8th	6th	447	Total	50	.83[b]		7.41	3.08
Kaya Puzzles Test	Current Study[c]	X	4th and 6th	4th and 6th	507	Raw Total	41[d]	.71[c]	106.24	13.70	7.38
Spaulding Self-concept Inventory	Current Study	11-61	6th	4th, 6th	27	Overall Height	99	.85[e]		.599 .644	.232 .249
						Differentiation (S.D.)	99	.82[e]		.026 .021	.011 .009

---

[a] In raw score units.

[b] Kuder-Richardson Formula 20 (estimate of internal consistency). This formula results in spuriously high coefficients when used with speeded tests such as SCAT and STEP.

[c] Reliability coefficient represents an estimate of internal consistency computed by the split-half method and the Spearman-Brown correction. The author of the test battery (Kaya) advises that four factors are measured, thus this overall internal consistency measure is lower than would be expected for specific factors.

[d] Item by Item scores were not available, so part scores were used. Half A = Parts 1, 4, 6, 8; Half B = Parts 2, 3, 5A, 5B, 7.

[e] Test-retest method using the same form (one month apart).

Table

Coefficients of Agreement[a] Between Scorers of the Kaya Solving Puzzles Test

Group	N	Scorers[b]	Parts of Kaya Solving Puzzles Test								
			1	2	3	4	5a	5b[c]	6	7	8
First Trial											
Fourth Grade -Girls	15	S x B	1.00	.90	.49	.94	.97		.92	.79	.82
		B x G	.99	.85	.59	.96	.93		.69	.79	.79
		S x G	1.00	.88	.38	.91	.90		.91	.95	.90
Second Trial											
Fourth Grade -Boys	14	S x B	1.00	.93	.99	.99	.97		.94	.97	1.00
		B x G	1.00	.68	.73	.98	.74		.94	.97	.91
		S x G	1.00	.67	.75	.97	.75		1.00	1.00	.89
First Trial											
Fourth Grade Boys) Girls)	26	S x B						.78			
Second Trial											
-Boys	15	S x B						.95			

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[a] Coefficients are Pearson product-moment correlations between total scores for each part of the Kaya Solving Puzzles Test.

[b] S = Suzanne Troffer
B = William Troffer
G = George Knightly

[c] Part 5b scored by Suzanne Troffer and William Troffer only.

Note: No complete class group was scored by one person. Each person scored half sections so that the group means do not reflect any particular scoring bias, and scoring error approaches randomization.

Table

Classroom Observation Schedule*

Classroom	First Day A.M.	First Day P.M.	Second Day A.M.	Second Day P.M.	Third Day A.M.	Third Day P.M.
03	S	-	P	-	P	-
04	S	-	S	-	P	-
05	S	-	P	-	S	-
06	S	-	S	-	P	-
07	P	-	P	-	S	-
08	S	-	P	-	P	-
09	S	-	P	-	S	-
10	S	-	P	-	S	-
11	S	-	P	-	S	-
12	S	-	P	-	P	-
13	P	-	P	-	S	-
14	P	-	S	-	P	-
15	S	-	S	S	P	-
52	P	-	P	-	S	-
53	S	-	S	-	P	-
54	S	-	S	S	S	-
55	P	-	P	-	S	-
56	P	S	P	S	S	-
57	P	-	P	-	P	-
58	S	-	S	-	P	-
59	P	-	P	-	S	-

---

*S = Spaulding; P = Pintler; - indicates no observation made.

Table

Coefficients of Agreement Between Observers* Using the Transaction Sample: Classroom (TSC)

Variable	TSC Col. No.	First Day		Second Day		Third Day		All Days	
		Units	Coeff.	Units	Coeff.	Units	Coeff.	Units	Coeff.
Activity Level of Children	24	688	.95	646	.99	677	.92	2011	.96
Molar Teacher Behavior	25	688	.97	646	.98	677	.94	2011	.96
Direction of Communication	27, 35, 43, 51	515	.86	495	.86	337	.87	1387	.86
Publicity of Communication	30, 38, 46, 54	515	.97	495	.98	337	.94	1387	.97
Listening Technique	55	141	.92	153	.92	68	.93	362	.92

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*These coefficients represent the proportion of agreement between two observers after independent, simultaneous observation for three full mornings in a trial sixth grade classroom. The following formula was used to compute the coefficients:

$$\text{Coefficient of agreement} = \frac{\text{2 x total number of agreements}}{\text{Total units of Observer A plus total units of Observer B}}$$

Appendix C

Raw and Standardized
TSC Scores

Table C 1

Teacher behavior raw scores[1]

Teacher ID No.	TSC Cat.	25-1	25-2	25-3	25-4	25-6	25-8	26-1	26-2	26-4	27-2	27-3	30-1	30-2	30-3	31-1
03		8.7	12.1	38.3	9.9	26.8	4.2	7.4	1.9	88.9	22.2	48.2	59.3	37.0	3.7	79.6
04		11.4	8.2	28.9	20.8	6.5	22.4	10.5	00.0	89.5	4.0	63.2	30.3	59.2	10.5	67.1
05		8.2	14.9	41.4	23.0	9.5	0.4	12.5	00.0	85.7	1.8	51.8	73.2	23.2	3.6	51.8
06		13.9	5.2	26.7	20.0	16.1	7.4	7.1	00.0	92.9	3.5	63.5	51.8	29.4	18.8	44.7
07		13.1	11.9	38.8	19.6	9.3	7.1	10.1	00.0	89.9	1.1	60.7	59.6	27.0	13.5	68.5
08		11.1	9.3	47.9	17.5	5.0	9.0	4.1	1.4	94.6	14.9	36.5	60.8	39.2	00.0	90.5
09		12.1	12.3	29.3	27.7	9.7	9.0	1.5	00.0	98.6	7.3	68.1	40.6	53.6	5.8	81.2
10		12.9	4.2	50.9	23.2	4.8	2.7	3.8	00.0	96.3	1.3	43.8	70.0	26.3	3.8	68.8
11		18.3	6.5	29.7	15.6	11.2	17.9	10.9	4.2	84.9	5.0	51.3	64.7	26.1	9.2	63.9
12		9.5	11.7	31.1	19.1	13.4	14.6	3.2	3.2	93.7	6.4	54.0	50.8	41.3	7.9	71.4
13		9.2	9.5	32.8	21.9	11.8	14.4	1.6	1.6	96.9	4.7	23.4	48.4	45.3	6.3	68.8
14		9.2	9.5	30.7	21.5	20.4	6.7	10.7	00.0	89.3	00.0	73.2	67.9	28.6	3.6	76.8
15		9.4	12.0	34.5	18.5	15.4	8.7	1.6	00.0	98.4	15.6	50.0	20.3	75.0	4.7	82.8
52		13.2	7.3	46.7	22.5	6.5	2.9	3.6	00.0	96.4	4.8	50.6	90.4	6.0	3.6	57.8
53		13.8	14.7	45.9	18.6	5.6	1.4	9.9	1.2	88.9	4.9	53.1	71.6	22.2	6.2	76.5
54		15.8	11.8	29.5	20.2	4.4	15.3	11.2	00.0	88.8	10.2	42.9	37.8	37.8	24.5	69.4
55		13.5	15.5	29.0	26.8	6.8	8.2	2.3	00.0	97.7	16.1	41.4	16.1	73.6	10.3	64.4
56		7.8	4.4	33.9	17.0	20.3	15.3	10.4	00.0	89.6	2.1	72.9	27.1	58.3	14.6	77.1
57		9.0	6.7	26.0	38.0	7.6	11.5	2.0	00.0	98.0	6.0	52.0	28.0	56.0	16.0	68.0
58		16.9	6.4	15.7	22.2	9.2	11.8	3.6	00.0	96.4	2.7	58.2	60.0	27.3	12.7	53.6
59		13.5	14.7	37.5	30.1	1.5	2.8	11.0	4.4	84.6	6.6	59.3	35.2	48.4	16.5	67.0

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[1] Percentages of observed behavior within TSC categories

(continued on next page)

Raw scores -2

Table C 1 (continued)

T	Cat.	31-2	31-3	31-4	32-1	32-2	32-3	32-4	32-5	32-6	32-8	33-2	33-3	33-4	33-5	33-6
03		18.5	1.9	00.0	44.4	22.2	7.4	7.4	11.1	00.0	3.7	1.9	5.6	00.0	74.1	16.7
04		21.1	11.8	00.0	15.8	10.5	5.3	2.6	42.1	10.5	10.5	29.0	23.7	00.0	4.0	42.1
05		35.7	00.0	8.9	32.1	17.9	00.0	1.8	14.3	7.1	21.4	8.9	12.5	1.8	35.7	37.5
06		54.1	1.2	00.0	35.3	10.6	2.4	20.0	7.1	3.5	8.2	2.4	32.9	5.9	30.6	12.9
07		28.1	2.3	1.1	38.2	13.5	1.1	21.4	12.4	2.3	6.7	5.6	60.7	1.1	23.6	5.6
08		9.5	00.0	00.0	50.0	9.5	5.4	18.9	2.7	2.7	9.5	5.4	35.1	00.0	52.7	5.4
09		17.4	00.0	1.5	55.1	10.1	2.9	8.7	17.4	00.0	2.9	1.5	15.9	00.0	62.3	20.3
10		16.3	13.8	1.3	41.3	15.0	3.8	17.5	10.0	7.5	3.8	3.8	37.5	3.8	38.8	13.8
11		27.7	6.7	1.7	17.7	12.6	22.7	10.1	24.4	7.6	2.5	7.6	46.2	00.0	20.2	21.9
12		23.8	4.8	00.0	34.9	6.4	9.5	11.1	9.5	23.8	1.6	28.6	11.1	00.0	54.0	3.2
13		20.3	7.8	3.1	25.0	14.1	20.3	7.8	18.8	3.1	1.6	15.6	26.6	00.0	35.9	17.2
14		19.6	1.8	1.8	42.9	14.3	00.0	8.9	17.9	7.1	3.6	12.5	16.1	3.6	57.1	8.9
15		17.2	00.0	00.0	45.3	7.8	3.1	10.9	23.4	1.6	3.1	7.8	18.8	00.0	50.0	23.4
52		37.4	4.8	00.0	33.7	1.2	7.2	20.5	30.1	2.4	1.2	16.9	27.7	2.4	34.9	14.5
53		18.5	1.2	3.7	22.2	28.4	16.1	13.6	11.1	3.7	3.7	4.9	21.0	2.5	51.9	18.5
54		29.6	00.0	1.0	13.3	9.2	8.2	4.1	40.8	8.2	10.2	13.3	24.5	00.0	17.4	42.9
55		29.9	00.0	5.8	39.1	23.0	1.2	11.5	13.8	1.2	8.1	2.3	8.1	9.2	60.9	17.2
56		20.8	2.1	00.0	41.7	6.3	00.0	10.4	18.8	8.3	4.2	12.5	45.8	00.0	16.7	16.7
57		32.0	00.0	00.0	34.0	10.0	00.0	6.0	34.0	00.0	12.0	8.0	38.0	2.0	12.0	38.0
58		36.4	10.0	00.0	28.2	9.1	7.3	3.6	28.2	6.4	7.3	12.7	30.0	00.0	19.1	23.6
59		26.4	5.5	00.0	39.6	2.2	4.4	9.9	17.6	6.6	16.5	14.3	7.7	00.0	41.8	34.1

(continued on next page)

Table C 1(continued)

T	Cat.	33-8	34-1	34-2	34-4	35-1	35-2	35-3	35-4	38-1	38-2	38-3	39-1	39-2	39-3	39-4
03		1.9	12.0	1.3	86.7	14.7	30.7	21.3	33.3	72.0	28.0	00.0	84.0	8.0	2.7	2.7
04		1.3	40.0	14.6	45.5	12.7	5.5	74.6	7.3	38.2	47.3	14.6	85.5	5.5	5.5	00.0
05		00.0	34.3	1.0	64.7	11.8	8.8	53.9	25.5	94.1	4.9	1.0	48.0	2.9	1.0	28.4
06		10.6	12.5	3.1	81.3	53.1	25.0	18.8	3.1	78.1	18.8	3.1	62.5	6.3	00.0	31.3
07		1.1	19.8	00.0	80.3	30.9	6.2	46.9	12.4	59.3	33.3	7.4	45.7	2.5	00.0	37.0
08		00.0	32.3	11.3	56.5	17.7	12.9	21.0	48.4	87.1	12.9	00.0	80.7	1.6	00.0	12.9
09		00.0	15.7	10.0	74.3	8.6	22.9	52.9	15.7	35.7	61.4	2.9	78.6	00.0	00.0	17.1
10		1.3	19.2	00.0	80.8	7.7	00.0	46.2	42.3	73.1	23.1	3.9	50.0	15.4	3.9	30.8
11		4.2	14.3	16.7	69.1	16.7	9.5	69.1	4.8	69.1	31.0	00.0	59.5	4.8	00.0	23.8
12		00.0	11.1	15.4	70.5	25.6	9.0	30.8	34.6	52.6	42.3	5.1	51.3	1.3	5.1	19.2
13		3.1	13.6	3.0	83.3	9.1	3.0	57.6	30.3	36.4	59.1	4.6	68.2	9.1	1.5	10.6
14		1.8	15.5	8.6	75.9	15.5	00.0	65.5	19.0	84.5	13.8	1.7	86.2	00.0	00.0	12.1
15		00.0	6.1	1.2	92.7	7.3	4.9	57.3	30.5	46.3	50.0	3.7	57.3	2.4	00.0	28.1
52		3.6	17.4	4.4	78.3	13.0	6.5	60.9	19.6	73.9	23.9	2.2	63.0	15.2	2.2	19.6
53		1.2	25.6	7.0	67.4	32.6	1.2	55.8	10.5	82.6	11.6	5.8	65.1	1.2	1.2	12.8
54		2.0	15.1	4.1	80.8	9.6	19.2	49.3	21.9	28.8	63.0	8.2	48.0	8.2	00.0	39.7
55		00.0	10.0	00.0	89.0	30.0	10.0	39.0	20.0	52.0	41.0	7.0	30.0	3.0	00.0	46.0
56		6.3	11.8	7.4	77.8	33.3	18.5	40.7	7.4	59.3	40.7	00.0	37.0	7.4	00.0	25.9
57		2.0	5.4	00.0	94.6	13.5	32.4	5.4	48.7	24.3	67.6	8.1	78.4	00.0	00.0	21.6
58		12.7	11.3	7.1	78.6	16.7	2.4	31.0	50.0	35.7	45.2	19.1	61.9	4.8	4.8	23.8
59		1.1	14.1	7.1	78.8	7.1	11.1	45.5	36.4	52.5	41.4	6.1	70.7	2.0	5.1	9.1

(continued on next page)

Table C 1 (continued)

T	Cat.	39-5Gp	39-5B	39-5G	40-3	40-4	40-5	40-8	40-9	40-11	40-12	41-1Gp	41-1B	41-1G
03		00.0	00.0	00.0	22.7	5.3	22.7	2.7	14.7	29.3	1.3	8.8	00.0	8.0
04		00.0	00.0	00.0	18.2	7.3	12.7	14.6	5.5	34.5	3.6	00.0	4.9	00.0
05		3.2	9.1	3.9	28.4	6.9	17.7	20.6	19.6	2.0	2.0	25.0	10.9	19.2
06		00.0	00.0	00.0	00.0	6.3	12.5	00.0	75.0	3.1	3.1	56.0	16.7	00.0
07		3.0	00.0	00.0	8.6	4.9	9.9	00.0	55.6	11.1	9.9	36.4	15.8	20.0
08		5.3	00.0	00.0	25.8	3.2	40.3	12.9	11.3	00.0	3.2	10.5	7.7	00.0
09		00.0	00.0	00.0	10.0	24.3	31.4	12.9	14.3	1.4	1.4	36.4	16.2	18.2
10		00.0	00.0	00.0	3.9	19.2	23.1	00.0	30.8	7.7	15.4	00.0	25.0	9.1
11		00.0	00.0	00.0	9.5	11.9	42.9	7.1	16.7	4.8	4.8	27.3	3.5	00.0
12		3.7	00.0	00.0	25.6	7.7	15.4	3.9	29.5	11.5	2.6	11.1	25.0	00.0
13		00.0	5.3	00.0	3.0	12.1	36.4	10.6	18.2	9.1	1.5	20.0	13.2	00.0
14		00.0	00.0	00.0	8.6	3.5	24.1	3.5	37.9	17.2	5.2	11.1	00.0	27.3
15		10.0	00.0	00.0	13.4	22.0	14.6	12.2	24.4	4.9	2.4	00.0	25.5	4.0
52		00.0	00.0	00.0	00.0	10.9	15.2	8.7	50.0	10.9	4.4	33.3	10.7	11.1
53		3.5	6.3	00.0	29.1	00.0	18.6	5.8	18.6	22.1	3.5	17.2	4.2	11.1
54		4.6	5.6	00.0	2.7	19.2	28.8	15.1	11.0	13.7	5.5	18.2	33.3	6.3
55		12.2	2.6	00.0	1.0	16.0	13.0	5.0	54.0	7.0	3.0	41.5	23.1	20.0
56		35.7	9.1	00.0	18.5	29.6	22.2	00.0	18.5	3.7	3.7	50.0	54.6	00.0
57		00.0	00.0	00.0	00.0	16.2	21.6	2.7	51.4	2.7	5.4	24.5	00.0	11.1
58		00.0	7.7	00.0	00.0	14.3	33.3	4.8	33.3	7.1	7.1	25.0	7.7	00.0
59		00.0	00.0	00.0	30.3	5.1	23.2	17.2	7.1	11.1	1.0	38.9	13.3	13.9

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Table C 1 (continued)

T	Cat.	41-2	41-5Gp	41-5B	41-5G	41-6	42-1	42-2	42-3	42-4	42-5	43-1	43-2	43-3
03		00.0	73.5	18.8	76.0	24.0	11.4	8.0	12.2	65.8	2.5	43.0	36.7	11.0
04		11.6	00.0	14.6	00.0	56.4	23.3	10.9	17.6	45.6	2.6	29.5	15.5	41.5
05		5.9	18.8	29.1	38.5	34.3	11.7	5.7	22.3	59.0	1.4	26.5	0.4	37.1
06		00.0	12.0	50.0	00.0	15.6	6.8	5.5	41.7	42.9	3.1	39.3	8.0	38.0
07		2.5	6.1	10.5	20.0	43.2	19.4	7.6	17.9	50.2	4.9	60.5	1.9	24.7
08		00.0	10.5	38.5	66.7	33.9	6.0	3.1	49.1	26.4	15.4	46.5	28.3	9.1
09		1.4	13.6	27.0	45.5	42.9	7.2	7.8	28.7	54.5	1.8	25.8	28.7	26.4
10		00.0	33.3	25.0	63.6	19.2	7.9	5.4	26.9	57.0	2.9	53.5	0.3	19.0
11		1.8	27.3	20.7	50.0	47.6	10.4	19.2	15.5	52.9	2.1	38.3	11.9	30.6
12		1.3	11.1	20.8	18.5	65.4	7.3	10.6	38.2	43.5	0.5	49.8	14.5	19.8
13		1.5	80.0	26.3	35.0	50.0	7.1	3.1	27.8	59.9	2.2	33.9	32.2	16.3
14		1.7	33.3	55.3	45.5	22.4	4.8	2.1	28.3	58.8	5.9	35.8	0.5	42.3
15		00.0	20.0	12.8	56.0	47.6	5.5	6.0	25.1	45.1	18.3	25.1	53.6	9.4
52		00.0	11.1	14.3	77.8	37.0	5.1	5.1	37.5	49.8	2.4	68.3	1.4	20.5
53		00.0	10.3	35.4	22.2	54.7	10.8	10.8	36.4	40.9	1.1	36.1	22.3	26.0
54		00.0	9.1	2.8	12.5	57.5	7.7	9.8	20.8	60.1	1.6	28.4	18.6	29.5
55		1.0	4.9	10.3	15.0	48.0	8.0	4.8	30.5	55.6	1.1	7.5	43.9	16.6
56		3.7	14.3	9.1	00.0	25.9	5.7	2.9	34.5	56.5	0.5	23.4	42.6	20.6
57		00.0	00.0	50.0	27.8	59.5	2.8	4.1	12.4	80.0	0.7	24.8	10.3	31.0
58		00.0	00.0	53.9	52.4	35.7	7.8	4.9	29.4	57.8	00.0	64.7	1.0	16.7
59		6.1	11.1	31.1	33.3	39.4	10.3	4.8	24.2	57.5	3.2	25.0	21.8	31.0

(continued on next page)

Table C 1 (continued)

T	Cat.	43-4	46-1	46-2	46-3	47-1	47-2	47-4	47-6	48-1	48-2	48-3	48-4	48-5	48-6
03		9.3	89.9	10.1	00.0	97.1	2.1	00.0	00.0	43.9	3.0	16.9	17.3	5.9	8.9
04		13.5	39.4	44.6	16.1	96.4	2.1	1.0	00.0	54.9	9.3	00.0	8.3	9.3	18.1
05		36.0	73.1	23.3	3.5	60.8	19.8	15.9	3.2	20.5	6.4	14.5	25.1	6.0	10.6
06		14.7	71.8	22.1	6.1	66.9	31.3	1.8	00.0	22.1	9.8	4.9	12.9	11.7	32.5
07		12.9	82.9	11.8	5.3	94.3	1.9	2.3	0.8	46.8	8.4	0.4	19.8	7.2	12.2
08		16.0	65.1	34.3	0.6	92.8	2.5	4.7	00.0	38.4	00.0	00.0	10.7	8.9	13.2
09		19.2	52.7	43.7	3.6	95.2	1.8	1.8	0.6	27.0	8.4	5.4	25.8	2.4	12.0
10		27.2	81.7	14.6	3.8	91.8	5.7	0.6	00.0	43.4	5.7	2.5	16.5	5.7	14.9
11		18.7	57.0	34.7	8.3	92.2	3.6	4.2	00.0	38.3	8.3	00.0	30.1	7.8	10.9
12		15.5	64.3	31.9	3.9	95.2	1.5	2.9	0.5	33.8	1.0	00.0	20.3	3.9	12.1
13		17.2	42.3	55.5	2.2	91.2	3.5	5.3	00.0	30.4	0.9	1.8	30.8	5.3	9.3
14		21.4	67.4	30.5	2.1	98.4	0.5	1.1	00.0	47.6	3.7	2.7	13.4	3.7	21.4
15		11.9	35.3	60.0	4.7	98.3	0.9	0.9	00.0	40.0	2.1	00.0	28.9	3.4	8.5
52		9.9	92.5	7.5	00.0	92.8	6.5	0.7	00.0	36.2	6.8	00.0	13.7	5.1	9.2
53		15.6	64.3	33.1	2.6	89.6	5.6	1.5	2.6	36.1	2.6	0.4	12.3	12.3	15.2
54		23.5	50.3	37.7	12.0	94.0	4.9	0.6	00.0	35.5	6.6	00.0	27.9	9.8	18.0
55		32.1	11.2	74.3	14.4	79.1	3.7	15.0	0.5	32.1	2.1	00.0	31.0	4.3	15.0
56		13.4	42.1	56.5	1.4	86.1	7.2	5.7	0.5	33.5	3.8	7.7	15.8	3.4	10.5
57		33.8	37.9	49.0	13.1	98.6	0.7	00.0	00.0	31.7	2.1	00.0	44.1	6.2	11.0
58		17.7	86.3	9.8	3.9	91.2	3.9	3.9	00.0	40.2	3.9	00.0	24.5	2.0	14.7
59		22.2	40.1	47.6	12.3	91.3	5.6	2.4	00.0	39.3	1.2	1.6	27.0	6.8	16.3

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Raw scores -7

Table C 1(continued)

T	Cat.	48-7	49-1	49-2	49-3	49-4	49-5	49-6	49-7	50-0	50-1	50-2	51-1	51-2	51-3
03		4.2	46.0	8.0	43.5	1.7	00.0	00.0	0.4	67.5	24.1	8.4	3.3	4.9	50.8
04		00.0	23.3	22.3	33.2	6.7	1.0	7.3	3.6	40.4	51.8	7.8	0.7	2.2	62.6
05		17.0	60.4	12.0	14.5	1.4	00.0	00.0	11.3	57.6	32.5	9.9	7.0	00.0	56.1
06		6.1	48.5	29.5	14.7	2.5	00.0	00.0	4.9	25.8	62.6	11.7	3.3	00.0	74.6
07		5.3	53.2	16.0	26.2	1.9	00.0	00.0	2.3	43.7	38.8	17.5	9.0	00.0	58.7
08		35.9	66.7	13.5	15.1	1.9	00.0	00.0	2.2	43.1	40.9	16.0	9.5	11.2	29.3
09		19.2	40.7	11.4	45.5	00.0	00.0	00.0	2.4	56.3	31.7	12.0	1.9	4.4	79.1
10		11.4	56.3	14.9	19.9	1.3	00.0	00.0	5.7	36.4	52.9	10.8	9.0	00.0	36.8
11		4.7	25.4	11.4	45.1	0.5	0.5	00.0	15.0	50.3	37.8	11.9	2.0	2.0	68.3
12		29.0	53.6	13.0	28.5	1.0	00.0	00.0	3.9	52.2	31.4	16.4	5.5	2.4	41.7
13		21.6	50.2	11.9	33.5	0.4	00.0	00.0	4.0	64.3	20.3	15.4	5.9	2.0	49.3
14		7.5	43.9	21.4	31.0	1.1	00.0	00.0	2.1	48.7	35.8	15.5	3.1	00.0	74.8
15		17.0	53.6	0.1	37.0	00.0	00.0	00.0	1.3	54.5	35.7	9.8	00.0	7.9	55.6
52		29.0	63.5	12.3	15.0	1.4	00.0	00.0	6.5	47.4	43.3	9.2	6.4	0.7	51.8
53		21.2	46.8	14.9	33.1	3.4	00.0	0.4	1.1	26.4	45.7	27.9	5.5	6.4	58.7
54		2.2	20.8	15.9	44.8	2.2	00.0	00.0	14.2	38.3	47.5	14.2	0.8	3.2	57.6
55		15.5	40.1	9.6	43.9	2.1	0.5	00.0	3.7	38.5	50.8	10.7	00.0	4.6	40.5
56		25.4	64.6	12.9	19.6	1.0	00.0	00.0	1.0	45.9	48.3	5.7	00.0	2.9	61.0
57		4.8	26.2	10.3	49.7	00.0	00.0	00.0	12.4	28.3	60.7	11.0	1.0	8.5	50.2
58		14.7	56.9	15.7	21.6	00.0	00.0	00.0	4.9	43.1	43.1	13.7	2.1	00.0	48.3
59		7.9	31.4	14.3	44.8	1.6	00.0	00.0	4.8	42.9	45.6	11.5	2.5	5.5	40.6

(continued on next page)

Table C 1(continued)

T	Cat.	51-4	54-1	54-2	54-3	55-1	55-2	56-1	56-2	56-3	56-5	56-7	57-0	57-1	57-2
03		41.0	41.0	42.6	16.4	80.3	19.7	39.3	39.3	18.0	1.6	1.6	50.8	37.7	11.5
04		34.5	38.9	39.6	21.6	93.5	6.5	13.0	70.5	10.1	2.9	1.4	33.8	59.0	7.2
05		36.9	67.5	28.7	3.8	96.8	3.2	58.6	18.5	8.3	00.0	10.8	52.2	35.0	12.7
06		22.1	65.6	23.8	10.7	95.9	4.1	32.8	59.0	7.4	00.0	0.8	23.0	72.1	4.9
07		32.3	63.9	24.1	12.0	92.5	7.5	12.8	72.9	10.5	00.0	3.0	24.8	69.9	5.3
08		50.0	67.2	32.8	00.0	99.1	0.9	34.5	64.7	00.0	00.0	00.0	23.3	58.6	18.1
09		14.6	34.8	55.7	9.5	88.0	12.0	63.9	29.8	5.7	00.0	0.6	48.1	37.3	14.6
10		54.2	64.6	25.7	9.7	96.5	3.5	43.1	43.8	10.4	00.0	2.1	20.8	69.4	9.7
11		27.7	47.5	43.6	8.9	95.1	5.0	18.8	61.4	8.9	00.0	10.9	31.7	60.4	7.9
12		50.4	34.7	50.4	15.0	98.4	1.6	59.8	33.9	5.5	00.0	0.8	37.8	37.0	25.2
13		42.8	21.1	70.4	8.6	88.2	11.8	62.5	29.6	5.3	00.0	2.6	61.2	23.0	15.8
14		22.1	61.8	24.4	13.7	88.6	11.5	45.0	53.4	0.8	00.0	0.8	38.2	45.8	16.0
15		36.5	7.9	81.8	10.3	82.5	17.5	55.6	34.9	5.6	00.0	4.0	56.4	28.6	15.1
52		41.1	84.4	12.1	3.6	94.3	5.7	51.1	44.7	2.1	00.0	0.7	44.7	44.7	10.6
53		28.4	59.6	33.0	6.4	86.2	12.8	17.4	71.6	10.1	00.0	00.0	31.2	44.0	23.9
54		38.4	27.2	51.2	21.6	88.8	11.2	14.4	80.0	3.2	00.0	2.4	22.4	68.0	9.6
55		54.9	2.9	84.4	12.7	87.3	12.1	63.6	17.9	15.0	00.0	1.7	27.2	65.3	7.5
56		36.2	17.1	73.3	9.5	95.2	4.8	9.5	86.7	3.8	00.0	00.0	28.6	53.3	18.1
57		40.3	31.3	56.9	11.9	92.4	7.6	19.9	57.8	17.5	00.0	4.7	37.9	54.0	8.1
58		49.0	44.1	26.2	29.7	92.4	7.6	32.4	63.5	4.1	00.0	00.0	35.9	47.6	16.6
59		51.5	37.6	54.5	7.9	95.5	4.5	42.6	48.5	6.4	0.5	1.5	35.2	46.0	18.8

Table C 2

Teacher behavior standard scores[1]

Teacher ID No.	TSC Cat.	25-1	25-2	25-3	25-4	25-6	25-8	26-1	26-2	26-4	27-2	27-3	30-1	30-2	30-3	31-1
03		39.1	55.9	54.2	29.4	75.8	41.4	51.9	56.7	42.3	76.4	45.7	54.3	48.2	40.9	59.6
04		47.8	45.1	43.4	48.6	43.3	72.2	59.6	44.1	43.6	45.1	58.2	39.6	60.7	51.8	48.2
05		37.1	63.7	57.9	52.2	48.3	35.0	64.5	44.1	35.7	41.4	48.7	61.3	40.5	40.6	34.1
06		56.6	36.7	40.8	47.2	58.6	46.7	50.9	44.1	51.1	44.5	58.5	50.5	44.0	65.1	27.8
07		53.6	55.4	54.9	46.3	47.8	46.2	58.6	44.1	44.5	40.4	56.1	54.4	42.6	56.5	49.5
08		47.2	48.1	65.4	42.6	41.0	49.6	43.5	53.2	54.5	63.7	35.9	55.1	49.4	35.0	69.5
09		50.5	56.2	43.7	60.6	48.4	49.4	37.1	44.1	63.0	50.8	62.3	44.8	57.6	44.3	60.9
10		52.9	33.7	68.9	52.6	40.8	38.9	42.7	44.1	58.1	40.5	42.0	59.7	42.2	40.9	49.6
11		71.4	40.1	44.3	39.3	51.0	64.5	60.6	73.5	33.8	47.0	48.3	57.0	42.1	49.8	45.2
12		41.4	54.8	46.0	45.6	54.3	58.9	41.3	65.8	52.6	49.2	50.5	50.0	50.6	47.7	52.1
13		40.8	48.7	47.8	50.5	51.9	58.8	37.3	54.6	59.4	46.3	25.1	48.8	52.9	45.0	49.6
14		40.8	48.7	45.5	49.8	65.5	45.7	60.1	44.1	43.2	38.5	66.6	58.6	43.5	40.6	56.9
15		41.1	55.7	49.8	44.4	57.5	48.9	37.3	44.1	62.8	65.1	47.3	34.6	69.6	42.4	62.5
52		54.2	42.6	64.0	51.4	43.5	39.0	42.5	44.1	58.3	46.7	47.8	70.0	30.8	40.8	39.7
53		56.2	62.9	63.1	44.7	42.1	36.5	57.8	52.5	42.3	46.8	49.8	60.5	39.9	44.8	56.8
54		63.0	54.8	44.1	47.3	40.0	60.3	61.3	44.1	42.1	55.9	41.3	43.4	43.6	74.1	50.2
55		54.9	65.1	43.4	58.9	44.0	48.2	39.3	44.1	61.3	65.8	40.0	32.5	68.8	51.5	45.6
56		35.7	34.2	49.2	41.9	65.3	60.1	59.3	44.1	43.8	41.9	66.3	38.0	60.2	58.3	57.2
57		40.1	40.6	39.9	78.4	45.1	53.8	38.5	44.1	62.0	48.7	48.9	38.5	58.9	60.7	49.0
58		66.3	40.1	27.9	51.0	47.8	54.3	42.5	44.1	58.3	43.1	54.0	54.7	42.7	55.4	35.9
59		55.2	63.2	53.3	64.6	35.4	39.0	60.6	74.9	33.4	49.6	55.0	42.1	54.6	61.3	48.1

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[1] Percentages converted to standard scores with a mean of 50 and a standard deviation of 10.

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Table C 2 (continued)

T	Cat.	31-2	31-3	31-4	32-1	32-2	32-3	32-4	32-5	32-6	32-8	33-2	33-3	33-4	33-5	33-6
03		42.6	45.7	43.8	58.6	65.2	52.0	44.2	42.3	39.7	44.1	39.1	35.8	43.7	68.9	46.5
04		45.2	69.3	43.8	32.8	47.6	48.6	36.1	71.2	59.6	57.1	74.0	48.3	43.7	32.2	67.9
05		60.0	41.4	82.7	47.6	58.6	40.5	34.6	45.2	53.2	77.9	48.2	40.6	50.7	48.9	64.1
06		78.6	44.0	43.8	50.4	47.6	44.1	65.4	38.5	46.3	52.7	39.7	54.7	67.8	46.1	43.4
07		52.3	46.6	48.6	53.1	51.9	42.2	67.6	43.4	43.9	49.8	44.0	73.9	48.2	42.5	37.3
08		33.4	41.4	43.8	63.7	45.9	48.9	63.6	34.5	44.8	55.0	43.7	56.3	43.7	57.8	37.1
09		41.4	41.4	50.0	68.2	47.0	45.0	46.4	48.1	39.7	42.6	38.6	43.0	43.7	62.8	49.5
10		40.3	73.8	49.1	55.8	54.4	46.2	61.2	41.3	53.9	44.1	41.5	57.9	59.0	50.4	44.1
11		52.0	57.3	50.8	34.6	50.7	75.5	48.6	54.6	53.9	41.8	46.4	63.9	43.7	40.7	50.9
12		48.0	52.6	43.8	50.1	41.2	55.2	50.5	40.8	84.8	39.9	73.4	39.7	43.7	58.4	35.2
13		44.5	59.9	57.4	41.2	52.8	71.9	44.9	49.4	45.6	39.9	56.8	50.3	43.7	49.0	46.9
14		43.8	45.5	51.3	57.2	53.1	40.5	46.8	48.5	53.2	43.7	52.8	43.1	58.2	60.1	40.1
15		41.2	41.4	43.8	59.4	43.5	45.3	50.1	53.8	42.5	42.9	46.8	44.9	43.7	56.3	52.2
52		61.7	52.8	43.8	49.0	33.5	51.7	66.1	60.0	44.2	39.3	58.4	51.1	53.6	48.4	44.7
53		42.6	44.3	60.0	38.7	74.6	65.3	54.5	42.3	46.7	44.1	43.1	46.4	53.6	57.3	48.1
54		53.8	41.4	48.2	30.6	45.5	53.0	38.5	70.0	55.0	56.5	53.7	48.9	43.7	39.2	68.5
55		54.1	41.4	68.7	53.8	66.3	42.2	51.0	44.7	41.8	52.3	39.7	37.5	81.9	62.1	47.0
56		45.0	46.2	43.8	56.1	41.1	40.5	49.3	49.4	55.4	44.9	52.8	63.6	43.7	38.8	46.5
57		56.3	41.4	43.8	49.3	46.8	40.5	41.9	63.7	39.7	59.9	47.1	58.3	52.0	36.4	64.5
58		60.6	65.1	43.8	44.0	45.3	51.7	37.8	58.2	51.6	50.8	53.1	52.7	43.7	40.1	52.4
59		50.5	54.2	43.8	54.2	35.0	47.3	48.3	48.3	52.0	68.3	55.0	37.3	43.7	52.0	61.1

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Table C 2 (continued)

T	Cat.	33-8	34-1	34-2	34-4	35-1	35-2	35-3	35-4	38-1	38-2	38-3	39-1	39-2	39-3	39-4
03		47.7	43.8	41.4	58.7	46.7	69.6	36.9	55.6	56.3	45.5	39.7	63.3	57.0	55.0	34.0
04		46.3	75.6	66.1	23.0	45.1	43.8	66.3	38.1	40.0	55.9	69.7	64.2	51.2	63.7	31.8
05		42.5	69.1	40.6	39.7	44.2	47.3	54.9	50.3	66.8	32.9	41.5	41.0	45.6	46.7	55.7
06		73.2	44.3	44.8	54.0	79.5	63.9	35.5	35.4	59.2	40.4	46.1	50.0	53.0	42.3	58.1
07		45.7	52.5	38.9	53.2	60.5	44.5	51.0	41.6	50.1	48.4	55.0	39.5	44.5	42.3	62.9
08		42.5	66.8	59.9	32.5	49.3	51.5	36.7	65.7	63.5	37.2	39.7	61.2	42.7	42.3	42.7
09		42.5	48.0	57.7	48.0	41.5	61.6	54.3	43.8	38.9	63.7	45.5	59.9	39.2	42.3	46.2
10		46.0	52.0	38.9	53.6	40.7	38.3	50.6	61.7	56.7	42.7	47.5	42.2	73.3	60.9	57.6
11		54.7	46.3	70.1	43.5	48.4	48.0	63.2	36.5	54.8	47.1	39.7	48.1	49.7	42.3	51.8
12		42.5	46.2	67.6	44.8	56.0	47.4	42.1	56.5	46.9	53.3	50.2	43.0	41.8	67.2	48.0
13		51.5	45.6	44.6	55.8	41.9	41.3	56.9	53.6	39.2	62.4	49.0	53.4	59.3	49.7	40.7
14		47.4	47.8	55.1	49.3	47.4	38.3	61.3	46.0	62.2	37.7	43.2	64.6	39.2	42.3	41.9
15		42.5	37.1	41.2	63.9	40.5	43.2	56.8	53.7	43.9	57.5	47.1	46.8	44.5	42.3	55.4
52		53.0	49.8	47.0	51.4	45.3	44.9	58.7	46.4	57.2	43.2	44.0	50.3	73.1	52.6	48.2
53		46.0	59.1	51.9	42.1	61.9	39.4	56.0	40.3	61.3	36.5	51.7	51.6	41.6	47.7	42.5
54		48.3	47.2	46.6	53.7	42.3	57.8	52.4	48.0	35.5	64.6	56.7	40.9	57.5	42.3	65.2
55		42.5	41.5	38.9	60.8	59.8	48.5	46.7	46.7	46.7	52.6	54.2	29.9	45.9	42.3	70.5
56		60.6	47.0	52.8	51.0	62.6	57.2	47.6	38.3	50.1	52.4	39.7	34.2	55.7	42.3	53.6
57		48.3	36.3	38.9	65.5	45.7	71.5	28.1	65.9	33.4	67.0	56.5	59.8	39.2	42.3	50.0
58		79.6	46.3	52.3	51.7	48.4	40.6	42.2	66.8	38.9	54.9	79.0	49.6	49.7	65.3	51.8
59		45.7	46.2	52.1	51.9	40.2	49.6	50.2	57.6	46.9	52.8	52.1	55.1	43.6	66.7	39.4

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Table C 2(continued)

T	Cat.	39-5Gp	39-5B	39-5G	40-3	40-4	40-5	40-8	49-9	49-11	40-12	41-1Gp	41-1B	41-1G
03		44.8	43.5	47.8	59.3	41.8	49.7	41.9	42.6	70.9	40.9	43.0	38.7	49.3
04		44.8	43.5	47.8	55.2	44.2	39.3	61.0	37.8	76.7	47.9	35.9	42.3	40.0
05		51.2	70.1	93.0	64.5	43.7	44.4	70.6	45.3	40.8	42.7	56.2	47.0	62.3
06		44.8	43.5	47.8	38.8	43.0	39.1	37.8	74.5	42.1	46.4	81.5	51.3	40.0
07		50.8	43.5	47.8	46.6	41.3	36.3	37.8	64.2	50.9	66.6	65.4	50.6	63.3
08		55.2	43.5	47.8	62.2	39.1	68.3	58.4	40.9	38.7	46.7	44.4	44.5	40.0
09		44.8	43.5	47.8	47.8	65.8	58.9	58.2	42.4	40.2	41.2	65.4	51.0	61.1
10		44.8	43.5	47.8	42.2	59.5	50.1	37.8	51.1	47.0	83.2	35.9	57.7	50.5
11		44.8	43.5	47.8	47.4	50.2	70.9	49.1	43.7	43.8	51.2	58.0	41.3	40.0
12		52.2	43.5	47.8	62.0	44.7	42.0	43.8	50.5	51.3	44.5	44.9	57.7	40.0
13		44.8	58.9	47.8	41.5	50.5	64.1	54.7	44.5	48.6	41.5	52.2	48.6	40.0
14		44.8	43.5	47.8	46.6	39.4	51.3	43.2	54.9	57.6	52.4	44.9	38.7	71.6
15		64.9	43.5	47.8	50.9	62.9	41.3	57.3	47.8	44.0	44.2	35.9	58.1	44.7
52		44.8	43.5	47.8	38.8	48.8	41.9	51.7	61.3	50.6	50.0	63.0	46.8	52.9
53		51.6	61.8	47.8	65.1	35.1	45.5	47.0	44.8	62.9	47.3	49.9	41.8	52.9
54		53.8	59.8	47.8	41.2	59.4	56.1	61.8	40.7	53.8	53.3	50.6	64.0	47.2
55		69.3	50.9	47.8	39.7	55.4	39.6	45.8	63.5	46.4	46.1	69.6	56.2	63.3
56		16.6	70.1	47.8	55.6	72.7	49.3	37.8	44.7	42.7	48.2	76.6	80.1	40.0
57		44.8	43.5	47.8	38.8	55.7	48.6	42.1	62.0	41.6	53.3	55.8	33.7	52.9
58		44.8	66.0	47.8	38.8	53.1	60.9	45.3	52.5	46.5	58.4	56.2	44.5	40.0
59		44.8	43.5	47.8	66.3	41.4	50.3	65.1	38.6	50.9	40.0	67.5	48.8	56.1

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Table C 2(continued)

T	Cat.	41-2	41-5Gp	41-5B	41-5G	41-6	42-1	42-2	42-3	42-4	42-5	43-1	43-2	43-3
03		43.9	81.4	45.0	63.2	37.9	55.0	53.1	34.3	61.5	47.7	53.6	61.0	36.3
04		85.8	31.9	42.4	34.6	60.8	80.1	60.3	39.8	42.8	47.7	44.8	47.9	66.7
05		60.7	44.5	51.6	49.1	45.2	55.6	47.0	44.5	55.2	45.4	42.8	38.6	62.4
06		43.9	40.0	64.9	34.6	32.0	45.3	46.7	64.5	40.3	48.8	51.1	43.3	63.3
07		50.8	35.9	39.8	42.1	51.5	71.7	52.1	40.0	47.0	52.9	64.9	39.6	50.0
08		43.9	39.0	57.5	59.7	44.9	43.7	40.5	72.0	24.9	75.4	55.9	55.8	34.5
09		46.0	41.1	50.3	51.7	51.3	46.2	52.3	51.2	50.9	46.2	42.3	56.0	51.6
10		43.9	54.3	49.0	58.5	34.5	47.9	46.2	49.4	53.3	48.4	60.3	38.6	44.3
11		57.5	50.2	46.2	53.4	54.7	52.9	81.6	37.7	49.5	46.7	50.5	45.7	55.8
12		47.4	39.4	46.3	41.6	37.2	46.4	59.8	60.8	40.7	43.2	57.9	47.3	45.2
13		46.2	85.8	49.8	47.8	56.4	46.0	40.3	50.2	56.1	47.1	47.7	58.1	41.7
14		46.8	54.3	68.3	51.7	36.8	41.4	38.0	50.8	55.0	54.8	48.9	38.7	67.5
15		43.9	45.4	41.2	55.7	54.6	42.8	47.7	47.5	42.3	81.6	41.9	71.3	34.7
52		43.9	39.4	42.1	63.8	47.1	42.0	45.7	60.2	46.7	47.3	70.0	39.2	45.8
53		43.9	38.8	55.6	43.0	59.6	53.7	60.0	59.1	38.3	44.7	49.0	52.1	51.3
54		43.9	38.0	34.8	39.3	61.7	47.2	57.7	43.0	56.2	45.8	44.1	49.8	54.8
55		46.8	35.1	39.6	40.3	54.9	48.1	44.9	52.9	52.1	44.5	30.4	65.3	41.9
56		51.6	41.5	38.8	34.6	39.3	43.3	39.8	57.0	52.8	43.2	40.8	64.5	45.9
57		43.9	31.9	64.9	45.0	63.0	37.0	43.1	34.5	74.7	43.7	41.7	44.7	56.3
58		43.9	31.9	67.4	54.3	46.2	47.6	45.2	51.9	54.1	42.4	67.7	39.0	42.0
59		61.3	39.4	52.9	47.1	48.8	52.9	44.6	46.6	53.8	49.0	41.9	51.8	56.2

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Table C 2(continued)

T	Cat.	43-4	46-1	46-2	46-3	47-1	47-2	47-4	47-6	48-1	48-2	48-3	48-4	48-5	48-6
03		37.0	64.2	36.6	38.4	56.9	45.2	42.0	45.2	58.5	44.6	79.1	45.0	50.0	40.4
04		42.5	40.5	55.1	70.7	56.2	45.1	44.3	45.2	72.0	65.2	44.1	34.8	61.4	57.4
05		72.0	56.4	43.7	45.5	20.1	69.7	78.7	81.7	30.1	55.5	74.1	53.6	50.3	43.7
06		44.2	55.7	43.0	50.7	26.2	85.8	46.2	45.2	32.1	66.8	54.3	40.0	69.1	83.8
07		41.8	60.9	37.5	49.1	54.2	45.0	47.1	53.5	62.0	62.0	44.8	47.7	54.3	46.4
08		45.9	52.6	49.6	39.6	52.5	45.8	52.9	45.2	51.8	35.2	44.1	37.5	36.1	48.4
09		49.9	46.8	54.7	45.5	55.1	44.8	46.2	52.3	38.0	62.0	55.2	54.4	38.2	46.1
10		60.5	60.3	39.0	46.1	51.5	50.2	43.4	45.2	57.9	53.6	49.3	44.0	49.3	51.4
11		49.3	48.8	49.9	54.9	52.0	47.3	51.5	45.2	51.8	61.7	44.1	59.3	56.0	44.1
12		45.1	52.2	48.3	46.1	55.0	44.3	48.7	50.0	46.4	38.1	44.1	48.3	42.9	46.3
13		47.3	41.9	61.1	42.9	50.9	47.2	54.0	45.2	42.3	37.8	47.7	60.2	47.6	41.1
14		52.8	53.6	47.5	42.7	58.3	43.0	44.3	45.2	63.0	47.1	49.6	40.5	42.5	63.3
15		40.5	38.7	63.5	47.7	58.2	43.4	43.9	45.2	53.9	42.0	44.1	58.0	41.5	39.8
52		37.9	65.4	35.2	38.4	52.6	51.2	43.4	45.2	49.2	57.1	44.1	40.8	47.3	41.1
53		45.3	52.2	48.9	43.7	49.3	50.0	45.2	75.8	49.1	43.6	44.8	39.3	71.2	52.1
54		55.7	45.6	51.5	62.6	53.8	49.1	43.2	45.2	48.4	56.2	44.1	56.8	63.1	57.2
55		66.8	27.4	71.2	67.4	38.7	47.5	76.4	51.1	44.2	42.0	44.1	60.4	44.2	51.6
56		42.5	41.9	61.6	41.2	45.8	52.2	55.2	50.0	45.9	47.5	59.9	43.2	41.2	43.5
57		69.0	39.9	57.5	64.8	58.5	43.1	42.0	45.2	43.8	41.7	44.1	75.1	51.0	44.4
58		43.0	62.5	36.4	46.3	50.9	47.7	51.0	45.2	54.1	47.8	44.1	53.1	36.5	51.2
59		54.0	40.9	56.8	63.2	51.0	50.0	47.3	45.2	52.9	38.8	47.3	55.8	52.6	53.9

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Table C 2 (continued)

T	Cat.	48-7	49-1	49-2	49-3	49-4	49-5	49-6	49-7	50-0	50-1	50-2	51-1	51-2	51-3
03		40.0	49.7	37.5	59.8	50.5	46.1	47.7	39.2	69.6	33.4	40.6	48.3	55.1	47.0
04		35.8	33.6	65.8	51.3	84.5	84.6	93.5	46.5	45.6	59.0	39.1	40.3	46.4	56.0
05		52.6	60.0	45.5	35.9	49.2	46.1	47.7	64.0	60.8	41.3	43.7	60.4	39.9	51.0
06		41.9	51.5	80.2	36.1	55.8	46.1	47.7	49.4	32.6	68.8	47.5	48.3	39.9	65.3
07		41.1	54.9	53.2	45.6	52.5	46.1	47.7	43.3	48.5	46.9	60.0	66.7	39.9	53.0
08		39.3	64.4	48.5	36.4	51.8	46.1	47.7	43.3	47.9	48.9	57.0	68.0	74.6	30.5
09		54.7	46.0	44.1	61.6	39.8	46.1	47.7	43.7	59.6	40.5	48.2	44.1	53.5	68.8
10		47.0	57.1	51.0	40.4	47.8	46.1	47.7	51.2	42.0	59.9	45.6	66.7	39.9	36.3
11		40.4	35.0	44.3	61.2	43.2	65.3	47.7	72.4	54.3	46.1	48.2	44.1	45.8	60.5
12		64.5	55.1	47.5	47.5	45.8	46.1	47.7	46.9	56.0	40.2	57.9	55.6	47.0	40.0
13		57.1	52.7	45.1	51.6	42.5	46.1	47.7	47.1	66.8	30.0	55.7	56.9	45.8	45.9
14		43.2	48.2	64.0	49.6	46.5	46.1	47.7	43.0	52.9	44.3	55.9	47.6	39.9	65.5
15		52.7	55.1	37.5	54.5	39.8	46.1	47.7	41.0	58.0	44.2	43.4	38.1	64.3	50.7
52		64.6	62.1	45.9	36.4	48.5	46.1	47.7	52.8	51.8	51.2	42.4	58.1	42.1	47.7
53		56.7	50.3	51.0	51.2	61.8	46.1	49.6	40.8	33.1	53.4	82.4	55.6	59.7	53.1
54		37.9	31.7	53.0	61.0	53.8	46.1	47.7	70.6	43.6	55.0	53.1	40.6	49.8	52.3
55		51.2	45.5	40.7	60.2	53.8	65.3	47.7	46.7	43.9	58.1	45.6	38.1	54.1	39.0
56		60.9	62.9	47.3	40.2	45.8	46.1	47.7	40.3	50.5	55.8	34.8	38.1	48.6	54.8
57		40.6	35.7	42.1	65.0	39.8	46.1	47.7	66.5	34.8	67.1	46.2	40.9	66.2	46.6
58		50.4	57.4	52.6	41.7	39.8	46.1	47.7	49.4	48.0	51.0	52.1	44.4	39.9	45.0
59		43.6	39.3	49.9	61.0	49.8	46.1	47.7	49.0	47.7	53.3	47.3	45.7	56.6	39.1

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Table C 2 (continued)

T	Cat.	51-4	54-1	54-2	54-3	55-1	55-2	56-1	56-2	56-3	56-5	56-7	57-0	57-1	57-2
03		52.3	48.6	49.0	57.0	27.6	34.0	50.8	43.8	71.0	69.8	47.3	62.1	41.1	46.8
04		46.5	47.6	47.5	64.7	53.3	46.5	36.9	59.5	54.9	87.2	46.7	47.7	55.9	39.3
05		48.7	60.8	42.2	38.3	59.7	40.0	61.0	33.2	34.7	46.6	77.1	63.2	39.3	49.1
06		35.4	59.9	39.8	48.5	58.0	42.0	47.3	53.7	49.4	46.6	44.7	38.5	65.1	35.5
07		44.5	59.1	40.0	50.6	51.1	48.7	36.8	60.8	55.9	46.6	51.9	40.1	63.6	36.0
08		60.4	60.7	44.2	32.7	64.2	35.4	48.2	56.6	34.7	46.6	42.2	38.8	55.7	58.5
09		28.6	45.8	55.4	46.7	42.4	57.6	63.8	38.9	46.2	46.6	44.1	59.8	40.9	52.2
10		64.1	59.4	40.8	47.1	59.1	40.6	52.8	46.0	55.7	46.6	48.6	36.8	63.3	43.8
11		40.4	51.6	49.5	45.9	56.2	43.6	40.0	54.9	52.7	46.6	77.1	45.9	57.0	40.7
12		60.7	45.7	52.8	54.9	62.8	36.8	61.6	41.0	45.8	46.6	44.4	51.1	40.6	70.9
13		53.9	39.5	62.5	45.3	42.8	57.2	63.0	38.8	45.2	46.6	50.6	70.8	30.9	54.3
14		35.4	58.2	40.2	53.1	43.5	56.4	53.8	50.9	36.1	46.6	44.4	51.4	46.8	54.8
15		48.3	33.5	68.0	48.0	31.8	68.3	59.3	41.5	45.8	46.6	54.8	66.7	34.7	53.1
52		52.4	68.5	34.2	37.9	54.8	44.9	57.0	46.4	38.9	46.6	44.4	56.8	46.0	45.4
53		41.1	57.2	44.4	42.2	39.1	59.2	39.3	60.1	54.9	46.6	42.2	45.5	45.5	68.4
54		50.0	42.3	53.2	64.9	44.1	56.0	37.7	64.4	41.2	46.6	49.9	38.1	62.3	43.7
55		64.8	31.1	69.3	51.6	41.0	57.8	63.6	32.9	64.9	46.5	47.7	42.1	60.4	40.0
56		48.0	37.7	63.9	46.8	56.6	43.2	35.1	67.7	42.4	46.6	42.2	43.3	52.0	58.5
57		51.6	44.1	55.9	50.3	51.1	48.7	40.6	53.1	70.0	46.6	57.4	51.2	52.5	40.9
58		59.4	50.1	41.1	76.8	51.1	48.7	47.2	56.0	43.0	46.6	42.2	49.4	48.0	55.7
59		61.7	47.1	54.7	44.4	57.2	42.6	52.5	48.4	47.6	53.9	46.7	48.8	46.9	59.7